

EXHIBIT 1

US009967615B2

(12) **United States Patent**
Coburn, IV et al.

(10) **Patent No.:** **US 9,967,615 B2**
(45) **Date of Patent:** ***May 8, 2018**

(54) **NETWORKED MUSIC PLAYBACK**

(56) **References Cited**

(71) Applicant: **Sonos, Inc.**, Santa Barbara, CA (US)

U.S. PATENT DOCUMENTS

(72) Inventors: **Arthur Coburn, IV**, Cambridge, MA (US); **Joni Hoadley**, Santa Barbara, CA (US)

5,406,634 A 4/1995 Anderson et al.
5,440,644 A 8/1995 Farinelli et al.
(Continued)

(73) Assignee: **Sonos, Inc.**, Santa Barbara, CA (US)

FOREIGN PATENT DOCUMENTS

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

CA 2832542 A1 10/2012
CN 101212823 A 7/2008
(Continued)

This patent is subject to a terminal disclaimer.

OTHER PUBLICATIONS

(21) Appl. No.: **14/628,952**

International Bureau, "International Preliminary Report on Patentability", issued in connection with PCT application No. PCT/US2012/071212, dated Jul. 10, 2014, pp. 8.

(22) Filed: **Feb. 23, 2015**

(Continued)

(65) **Prior Publication Data**

US 2015/0172756 A1 Jun. 18, 2015

Primary Examiner — Oschat Montoya

(74) *Attorney, Agent, or Firm* — McDonnell Boehnen Hulbert & Berghoff LLP

Related U.S. Application Data

(63) Continuation of application No. 13/341,237, filed on Dec. 30, 2011, now Pat. No. 9,654,821.

(51) **Int. Cl.**

H04N 7/18 (2006.01)

H04N 21/436 (2011.01)

(Continued)

(52) **U.S. Cl.**

CPC ... **H04N 21/43615** (2013.01); **H04L 65/4084** (2013.01); **H04N 21/4307** (2013.01);

(Continued)

(58) **Field of Classification Search**

CPC H04N 21/43615; H04N 21/6581; H04N 21/439; H04N 21/6125; H04N 21/64322;

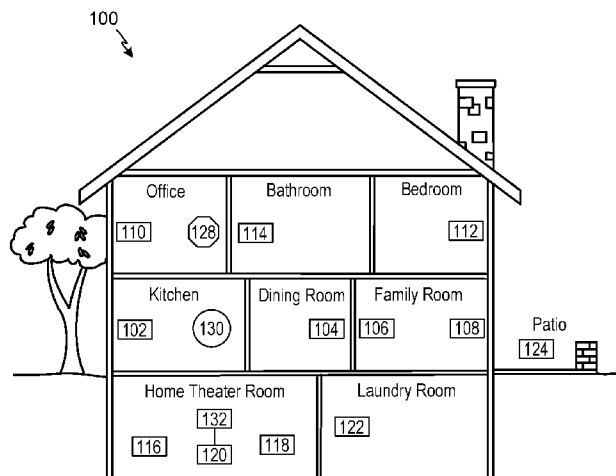
(Continued)

(57)

ABSTRACT

Systems, methods, apparatus, and articles of manufacture to facilitate connection to a multimedia playback network are disclosed. An example method includes detecting a first input including an identification of a playback device; detecting a second input including an identification of an item on a controller, wherein multimedia content associated with the item is retrievable from a content provider; detecting a trigger, wherein the trigger is not the first input or the second input; and sending, in response to detecting the trigger, information regarding the multimedia content from the controller to the playback device, wherein the information includes an identification of the multimedia content for playback by the playback device, and wherein the information causes (a) the playback device to retrieve, independent of the controller, the multimedia content from the content provider and (b) playback of the retrieved multimedia content.

29 Claims, 11 Drawing Sheets



US 9,967,615 B2

Page 2

(51)	Int. Cl.		7,725,551 B2	5/2010	Szeto et al.
	<i>H04N 21/658</i>	(2011.01)	7,742,740 B2	6/2010	Goldberg et al.
	<i>H04L 29/06</i>	(2006.01)	7,797,446 B2	9/2010	Heller et al.
	<i>H04N 21/439</i>	(2011.01)	7,805,682 B1	9/2010	Lambourne
	<i>H04N 21/61</i>	(2011.01)	7,827,259 B2	11/2010	Heller et al.
	<i>H04N 21/643</i>	(2011.01)	7,853,341 B2	12/2010	McCarty et al.
	<i>H04N 21/6587</i>	(2011.01)	7,958,441 B2	6/2011	Heller et al.
	<i>H04N 21/472</i>	(2011.01)	7,987,294 B2	7/2011	Bryce et al.
	<i>H04N 21/485</i>	(2011.01)	8,014,423 B2	9/2011	Thaler et al.
	<i>H04N 21/81</i>	(2011.01)	8,045,952 B2	10/2011	Qureshey et al.
	<i>H04N 21/43</i>	(2011.01)	8,050,652 B2	11/2011	Qureshey et al.
	<i>H04N 21/433</i>	(2011.01)	8,055,364 B2	11/2011	Champion
	<i>H04N 21/858</i>	(2011.01)	8,060,407 B1	11/2011	Delker et al.
			8,072,905 B2	12/2011	Haff et al.
			8,074,253 B1	12/2011	Nathan
(52)	U.S. Cl.		8,099,313 B2	1/2012	Messer et al.
	CPC	<i>H04N 21/439</i> (2013.01); <i>H04N 21/4333</i>	8,103,009 B2	1/2012	McCarty et al.
		(2013.01); <i>H04N 21/47202</i> (2013.01); <i>H04N</i>	8,111,132 B2	2/2012	Allen et al.
		<i>21/4852</i> (2013.01); <i>H04N 21/6125</i> (2013.01);	8,131,390 B2	3/2012	Braithwaite et al.
		<i>H04N 21/64322</i> (2013.01); <i>H04N 21/6581</i>	8,140,974 B2	3/2012	Hayter et al.
		(2013.01); <i>H04N 21/6587</i> (2013.01); <i>H04N</i>	8,148,622 B2	4/2012	Rothkopf et al.
		<i>21/8113</i> (2013.01); <i>H04N 21/8586</i> (2013.01)	8,156,435 B2	4/2012	Wohlert
			8,204,890 B1	6/2012	Gogan
			8,214,740 B2	7/2012	Johnson
			8,234,395 B2	7/2012	Millington
			8,290,603 B1	10/2012	Lambourne
			8,316,154 B2	11/2012	Yoneda
			8,364,296 B2 *	1/2013	Wilhelm G11B 27/10
					455/502
			8,407,623 B2	3/2013	Kerr et al.
(56)	References Cited		8,483,853 B1	7/2013	Lambourne
	U.S. PATENT DOCUMENTS		8,544,046 B2	9/2013	Gran et al.
	5,761,320 A	6/1998 Farinelli et al.	8,588,949 B2	11/2013	Lambourne et al.
	5,856,827 A	1/1999 Sudo	8,799,395 B2	8/2014	Seidel et al.
	5,923,902 A	7/1999 Inagaki	8,818,538 B2	8/2014	Sakata
	6,002,862 A	12/1999 Takaiki	8,843,586 B2	9/2014	Pantos et al.
	6,032,202 A	2/2000 Lea et al.	8,880,648 B1	11/2014	Arora et al.
	6,181,316 B1	1/2001 Little et al.	8,942,252 B2	1/2015	Balassanian et al.
	6,255,961 B1	7/2001 Van et al.	8,954,177 B2	2/2015	Sanders
	6,256,554 B1	7/2001 Dilorenzo	8,966,394 B2	2/2015	Gates et al.
	6,404,811 B1	6/2002 Cvetko et al.	9,137,602 B2	9/2015	Mayman et al.
	6,469,633 B1	10/2002 Wachter	9,338,206 B2	5/2016	Keum et al.
	6,522,886 B1	2/2003 Youngs et al.	9,507,780 B2	11/2016	Rothkopf et al.
	6,587,127 B1	7/2003 Lecke et al.	9,609,448 B2	3/2017	Bentley et al.
	6,611,537 B1	8/2003 Edens et al.	9,635,068 B2	4/2017	Garmark et al.
(56)	6,631,410 B1	10/2003 Kowalski et al.	2001/0042107 A1	11/2001	Palm
	6,728,531 B1	4/2004 Lee et al.	2002/0002039 A1	1/2002	Qureshey et al.
	6,732,155 B2	5/2004 Meek	2002/0022453 A1	2/2002	Balog et al.
	6,757,517 B2	6/2004 Chang	2002/0026442 A1	2/2002	Lipscomb et al.
	6,778,869 B2	8/2004 Champion	2002/0124097 A1	9/2002	Isely et al.
	6,826,283 B1	11/2004 Wheeler et al.	2002/0165921 A1	11/2002	Sapieyevski
	6,985,694 B1	1/2006 De et al.	2002/0178191 A1	11/2002	Sielken
	7,017,118 B1	3/2006 Carroll	2002/0194309 A1	12/2002	Carter et al.
	7,020,048 B2	3/2006 McComas	2003/0023741 A1	1/2003	Tomassetti et al.
	7,113,833 B1	9/2006 Brown et al.	2003/0079038 A1	4/2003	Robbin et al.
	7,117,451 B2	10/2006 Sielken	2003/0157951 A1	8/2003	Hasty
	7,130,608 B2	10/2006 Hollstrom et al.	2003/0198257 A1 *	10/2003	Sullivan et al. 370/516
	7,130,616 B2	10/2006 Janik	2003/0210796 A1	11/2003	McCarty et al.
	7,143,939 B2	12/2006 Henzerling	2004/0024478 A1	2/2004	Hans et al.
	7,178,106 B2	2/2007 Lamkin et al.	2004/0025185 A1	2/2004	Goci et al.
(56)	7,187,947 B1	3/2007 White et al.	2004/0078383 A1	4/2004	Mercer et al.
	7,236,773 B2	6/2007 Thomas	2004/0078812 A1	4/2004	Calvert
	7,295,548 B2	11/2007 Blank et al.	2004/0215611 A1	10/2004	Jawa et al.
	7,312,785 B2	12/2007 Tsuk et al.	2004/0261040 A1	12/2004	Radcliffe et al.
	7,358,960 B2	4/2008 Mak	2005/0028225 A1	2/2005	Dawson et al.
	7,391,791 B2	6/2008 Balassanian et al.	2005/0108320 A1	5/2005	Lord et al.
	7,483,538 B2	1/2009 McCarty et al.	2005/0138193 A1	6/2005	Encarnacion et al.
	7,509,181 B2	3/2009 Champion	2005/0155072 A1	7/2005	Kaczowka et al.
	7,571,014 B1	8/2009 Lambourne et al.	2005/0166157 A1	7/2005	Ollis et al.
	7,630,501 B2	12/2009 Blank et al.	2005/0235334 A1 *	10/2005	Togashi H04L 12/2807
	7,643,894 B2	1/2010 Braithwaite et al.	2005/0240494 A1	10/2005	725/117
	7,657,910 B1	2/2010 McAulay et al.	2005/0262253 A1	11/2005	Cue et al.
	7,689,304 B2	3/2010 Sasaki	2006/0002681 A1	1/2006	Spilo et al.
	7,725,533 B2	5/2010 Szeto et al.	2006/0041639 A1	2/2006	Lamkin et al.
			2006/0062094 A1	3/2006	Nathan et al.
			2006/0107237 A1	5/2006	Kim
			2006/0156236 A1	7/2006	Heller et al.
			2006/0168340 A1	7/2006	Heller et al.

See application file for complete search history.

US 9,967,615 B2

Page 3

(56)

References Cited

U.S. PATENT DOCUMENTS

2006/0195480 A1	8/2006	Spiegelman et al.	2011/0295974 A1	12/2011	Kashef et al.
2006/0195521 A1	8/2006	New et al.	2012/0029672 A1	2/2012	Hamilton et al.
2006/0195864 A1	8/2006	New et al.	2012/0038541 A1	2/2012	Song et al.
2006/0218294 A1	9/2006	Rosenberg	2012/0040720 A1	2/2012	Zhang et al.
2006/0253782 A1	11/2006	Stark et al.	2012/0050012 A1	3/2012	Alsina et al.
2006/0258289 A1 *	11/2006	Dua G06F 17/30058 455/41.3	2012/0054808 A1	3/2012	Nijim
2006/0263048 A1	11/2006	Sato et al.	2012/0057853 A1	3/2012	Huber et al.
2007/0038999 A1	2/2007	Millington et al.	2012/0089910 A1	4/2012	Cassidy
2007/0061725 A1	3/2007	Isaac et al.	2012/0113964 A1	5/2012	Petersen et al.
2007/0067808 A1	3/2007	Dacosta	2012/0117026 A1	5/2012	Cassidy
2007/0083897 A1	4/2007	Brownell	2012/0117193 A1	5/2012	Phillips et al.
2007/0106672 A1	5/2007	Sighart et al.	2012/0117586 A1 *	5/2012	McCoy et al. 725/25
2007/0142944 A1	6/2007	Goldberg et al.	2012/0147825 A1	6/2012	Hassan et al.
2007/0169087 A1	7/2007	Fadell	2012/0159372 A1	6/2012	Stallings et al.
2007/0266065 A1	11/2007	Rosenberg	2012/0174204 A1	7/2012	Sturm et al.
2007/0288470 A1	12/2007	Kauniskangas et al.	2012/0185770 A1	7/2012	Hwang et al.
2008/0005690 A1	1/2008	Van	2012/0192071 A1 *	7/2012	Millington H04J 3/0664 715/716
2008/0016465 A1	1/2008	Foxenland	2012/0202485 A1	8/2012	Mirbaha et al.
2008/0018625 A1	1/2008	Ijichi et al.	2012/0227076 A1	9/2012	McCoy et al.
2008/0025535 A1	1/2008	Rajapakse	2012/0233067 A1	9/2012	Matthew et al.
2008/0059567 A1	3/2008	Williams et al.	2012/0272062 A1	10/2012	Lee et al.
2008/0086379 A1	4/2008	Dion et al.	2012/0284423 A1	11/2012	Weel
2008/0133715 A1	6/2008	Yoneda et al.	2012/0304233 A1 *	11/2012	Roberts H04N 21/23113 725/82
2008/0134256 A1 *	6/2008	DaCosta H04N 7/17318 725/62	2012/0311094 A1	12/2012	Biderman et al.
2008/0177822 A1	7/2008	Yoneda	2012/0311618 A1	12/2012	Blaxland
2008/0209487 A1	8/2008	Osann et al.	2013/0014015 A1	1/2013	Lambourne et al.
2008/0242222 A1	10/2008	Bryce et al.	2013/0024018 A1	1/2013	Chang et al.
2008/0292120 A1	11/2008	Wilson	2013/0028263 A1	1/2013	Rajapakse
2009/0006542 A1	1/2009	Feldman et al.	2013/0047084 A1	2/2013	Sanders et al.
2009/0059512 A1	3/2009	Lydon et al.	2013/0054742 A1	2/2013	Tsuji et al.
2009/0097818 A1	4/2009	Hirata	2013/0073584 A1	3/2013	Kuper et al.
2009/0132712 A1	5/2009	P et al.	2013/0086003 A1	4/2013	Alsina et al.
2009/0171487 A1	7/2009	Wilhelm	2013/0111529 A1	5/2013	Yao et al.
2009/0172542 A1	7/2009	Girish et al.	2013/0117299 A1	5/2013	Kraatz
2009/0197524 A1	8/2009	Haff et al.	2013/0151728 A1	6/2013	Currier
2009/0222392 A1	9/2009	Martin et al.	2013/0157566 A1	6/2013	Oguchi
2009/0228919 A1 *	9/2009	Zott H04N 7/17318 725/34	2013/0165164 A1	6/2013	Rowe
2009/0248702 A1	10/2009	Schwartz et al.	2013/0167029 A1	6/2013	Friesen et al.
2009/0249222 A1	10/2009	Schmidt et al.	2013/0173034 A1	7/2013	Reimann et al.
2009/0259765 A1	10/2009	Karlsson et al.	2013/0246916 A1	9/2013	Reimann et al.
2009/0275285 A1	11/2009	Maricevic et al.	2013/0254207 A1	9/2013	Coburn, IV et al.
2010/0005496 A1 *	1/2010	Ellis et al. 725/87	2013/0300546 A1	11/2013	Kim et al.
2010/0009674 A1	1/2010	Sapkota et al.	2013/0326041 A1	12/2013	Bellet et al.
2010/0031366 A1	2/2010	Knight et al.	2013/0346559 A1	12/2013	Van et al.
2010/0042235 A1	2/2010	Basso et al.	2013/0346859 A1	12/2013	Bates et al.
2010/0082725 A1	4/2010	Onishi	2013/0347117 A1	12/2013	Parks et al.
2010/0082731 A1	4/2010	Haughay et al.	2014/0006483 A1	1/2014	Garmark et al.
2010/0087214 A1	4/2010	Bournel et al.	2014/0006947 A1	1/2014	Garmark et al.
2010/0094833 A1	4/2010	Svendsen	2014/0052770 A1	2/2014	Gran et al.
2010/0095332 A1	4/2010	Gran et al.	2014/0075308 A1	3/2014	Sanders et al.
2010/0206815 A1	8/2010	Garusi et al.	2014/0075314 A1	3/2014	Bachman et al.
2010/0211438 A1	8/2010	Lutnick et al.	2014/0080479 A1	3/2014	Vangala et al.
2010/0250669 A1	9/2010	Pan	2014/0096166 A1	4/2014	Gordon et al.
2010/0299402 A1	11/2010	Korman et al.	2014/0108929 A1	4/2014	Garmark et al.
2010/0299639 A1	11/2010	Ramsay et al.	2014/0115462 A1	4/2014	Reznor et al.
2010/0303244 A1	12/2010	Kim et al.	2014/0122737 A1	5/2014	Silberstein et al.
2010/0306815 A1 *	12/2010	Emerson G11B 27/034 725/134	2014/0123005 A1	5/2014	Forstall et al.
2011/0004330 A1	1/2011	Rothkopf et al.	2014/0140530 A1	5/2014	Gomes-Casseres et al.
2011/0047574 A1	2/2011	Tecot et al.	2014/0169569 A1	6/2014	Toivanen et al.
2011/0054641 A1	3/2011	Hur	2014/0195587 A1	7/2014	Sukoff et al.
2011/0055901 A1	3/2011	Karaoguz et al.	2014/0195925 A1	7/2014	Wikander
2011/0060998 A1	3/2011	Schwartz et al.	2014/0215009 A1	7/2014	Zhang
2011/0066943 A1	3/2011	Brillon et al.	2014/0229959 A1	8/2014	Beckhardt et al.
2011/0131272 A1	6/2011	Littlejohn et al.	2014/0378056 A1	12/2014	Liu
2011/0131518 A1	6/2011	Ohashi	2015/0026613 A1	1/2015	Kwon et al.
2011/0131520 A1	6/2011	Al-Shaykh et al.	2015/0074527 A1	3/2015	Sevigny et al.
2011/0179455 A1	7/2011	Thompson	2015/0074528 A1	3/2015	Sakalowsky et al.
2011/0218656 A1	9/2011	Bishop et al.	2015/0256954 A1	9/2015	Carlsson et al.
2011/0225496 A1	9/2011	Jeffe et al.	2015/0286360 A1	10/2015	Wachter
2011/0252118 A1	10/2011	Pantos et al.	2015/0304476 A1	10/2015	Katada
2011/0265003 A1	10/2011	Schubert et al.			

FOREIGN PATENT DOCUMENTS

CN	101212823 A	7/2008
EP	1389853 A1	2/2004
JP	2007060123 A	3/2007
JP	2007512718 A	5/2007

US 9,967,615 B2

Page 4

(56)

References Cited

FOREIGN PATENT DOCUMENTS

JP	2007199220	A	8/2007
JP	2008027537	A	2/2008
JP	2009044410		2/2009
JP	2010067097	A	3/2010
JP	2010510696		4/2010
JP	2012248199	A	12/2012
JP	2013101631	A	5/2013
KR	20090017795		2/2009
WO	0153994		7/2001
WO	2003093950	A2	11/2003
WO	2005013047	A2	2/2005
WO	2008047184	A1	4/2008
WO	2009086599	A1	7/2009
WO	2011049497	A1	4/2011
WO	2013049346	A1	4/2013
WO	2013055661	A1	4/2013
WO	2013101727		7/2013
WO	2014149533	A2	9/2014
WO	2014172462	A1	10/2014

OTHER PUBLICATIONS

"Welcome. You're watching Apple TV." Apple TV 1st Generation Setup Guide, Apr. 8, 2008 <http://manuals.info.apple.com/MANUALS/0/MA403/en_US/AppleTV_SetupGuide.pdf> Retrieved Oct. 14, 2014, 40 pages.

"Welcome. You're watching Apple TV." Apple TV 2nd Generation Setup Guide, Mar. 10, 2011 <http://manuals.info.apple.com/MANUALS/1000/MA1555/en_US/Apple_TV_2nd_gen_Setup_Guide.pdf> Retrieved Oct. 16, 2014, 36 pages.

The United States Patent and Trademark Office, "Non-Final Office Action", issued in connection with U.S. Appl. No. 14/520,566, dated Dec. 30, 2014, 10 pages.

Sonos, Inc., "Sonos Multi-Room Music System User Guide," Version 090401, Apr. 1, 2009, 256 pages.

Sonos, Inc., "Sonos Wireless Dock Product Guide," Version 100101, Oct. 10, 2001, 196 pages.

Australian Intellectual Property Office, "Patent Examination Report No. 1", issued in connection with Australian patent application No. 2012362573, dated Jan. 16, 2015, 3 pages.

The United States Patent and Trademark Office, "Non-Final Office action", issued in connection with U.S. Appl. No. 13/341,237, dated Jan. 25, 2013, 9 pages.

The United States Patent and Trademark Office, "Final Office action", issued in connection with U.S. Appl. No. 13/341,237, dated Aug. 6, 2013, 14 pages.

The United States Patent and Trademark Office, "Advisory action", issued in connection with U.S. Appl. No. 13/341,237, dated Oct. 16, 2013, 3 pages.

The United States Patent and Trademark Office, "Non-Final Office action", issued in connection with U.S. Appl. No. 13/341,237, dated Nov. 26, 2013, 15 pages.

The United States Patent and Trademark Office, "Final Office action", issued in connection with U.S. Appl. No. 13/341,237, dated Apr. 14, 2014, 12 pages.

The United States Patent and Trademark Office, "Non-Final Office action", issued in connection with U.S. Appl. No. 13/341,237, dated Oct. 8, 2014, 18 pages.

Advisory Action dated Dec. 16, 2015, issued in connection with U.S. Appl. No. 13/904,949, filed May 29, 2013, 11 pages.

Advisory Action dated Dec. 2, 2015, issued in connection with U.S. Appl. No. 13/904,936, filed May 29, 2013, 4 pages.

Canadian Office Action dated Nov. 12, 2015, issued in connection with Canadian Application No. 2,861,790, 3 pages.

Final Office Action dated Dec. 7, 2015, issued in connection with U.S. Appl. No. 13/864,075, filed Apr. 16, 2013, 16 pages.

Non-Final Office Action dated Nov. 18, 2015, issued in connection with U.S. Appl. No. 13/904,896, filed May 29, 2013, 18 pages.

Non-Final Office Action dated Nov. 18, 2015, issued in connection with U.S. Appl. No. 13/904,932, filed May 29, 2013, 12 pages.

Non-Final Office Action dated Dec. 28, 2015, issued in connection with U.S. Appl. No. 14/520,566, filed Oct. 22, 2014, 10 pages.

Pre-Interview First Office Action dated Dec. 22, 2015, issued in connection with U.S. Appl. No. 14/520,578, filed Oct. 22, 2014, 9 pages.

Voyetra Turtle Beach, Inc., "AudioTron Quick Start Guide, Version 1.0", Mar. 2001, 24 pages.

Voyetra Turtle Beach, Inc., "AudioTron Reference Manual, Version 3.0", May 2002, 70 pages.

Voyetra Turtle Beach, Inc., "AudioTron Setup Guide, Version 3.0", May 2002, 38 pages.

Bluetooth, "Specification of the Bluetooth System: The ad hoc SCATTERNET for affordable and highly functional wireless connectivity" Core, Version 1.0 A, Jul. 26, 1999, 1068 pages.

Bluetooth, "Specification of the Bluetooth System: Wireless connections made easy" Core, Version 1.0 B, Dec. 1, 1999, 1081 pages.

Dell, Inc., "Dell Digital Audio Receiver: Reference Guide" Jun. 2000, 70 pages.

Dell, Inc., "Start Here" Jun. 2000, 2 pages.

United States Patent and Trademark Office, "Final Office Action", issued in connection with U.S. Appl. No. 13/341,237, dated Apr. 22, 2015, 11 pages.

International Searching Authority, "International Search Report", issued in connection with PCT Application No. PCT/US2014/039669, dated Sep. 22, 2014, 3 pages.

International Searching Authority, "International Search Report", issued in connection with PCT Application No. PCT/US2014/034290, dated Aug. 21, 2014, 3 pages.

International Searching Authority, "International Search Report", issued in connection with PCT Application No. PCT/US2014/034292, dated Aug. 14, 2014, 3 pages.

International Searching Authority, "International Search Report", issued in connection with PCT Application No. PCT/US2014/034372, dated Aug. 20, 2014, 3 pages.

Jo J., et al., "Synchronized One-to-many Media Streaming with Adaptive Playout Control," Proceedings of SPIE, 2002, vol. 4861, pp. 71-82.

Jones, Stephen. "Dell Digital Audio Receiver: Digital upgrade for your analog stereo" Analog Stereo. Jun. 24, 2000 <<http://www.reviewsonline.com/articles/961906864.htm>> retrieved Jun. 18, 2014, 2 pages.

Louderback, Jim. "Affordable Audio Receiver Furnishes Homes With MP3" TechTV Vault. Jun. 28, 2000 <<http://www.g4tv.com/articles/17923/affordable-audio-receiver-furnishes-homes-with-mp3/>> retrieved Jul. 10, 2014, 2 pages.

Motorola, "Simplefi, Wireless Digital Audio Receiver, Installation and User Guide", Dec. 31, 2001, 111 pages.

United States Patent and Trademark Office, "Non-Final Office Action", issued in connection with U.S. Appl. No. 13/864,081, dated Mar. 10, 2015, 13 pages.

United States Patent and Trademark Office, "Non-Final Office Action", issued in connection with U.S. Appl. No. 13/904,949, dated Mar. 13, 2015, 20 pages.

United States Patent and Trademark Office, "Non-Final Office Action", issued in connection with U.S. Appl. No. 13/904,896, dated Mar. 2, 2015, 15 pages.

United States Patent and Trademark Office, "Non-Final Office Action", issued in connection with U.S. Appl. No. 13/904,944, dated Apr. 23, 2015, 12 pages.

Sonos, "SonosTM Digital Music System User Guide", Version: 070101, Sonos, Inc., Jan. 2007, 179 pages.

Palm, Inc. "Handbook for the Palm VII Handheld" May 2000, 311 pages.

Higgins et al., "Presentations at WinHEC 2000" May 2000, 138 pages.

PRISMIQ: Inc., "PRISMIQ Media Player User Guide", 2003, 44 pages.

UPnP, "Universal Plug and Play Device Architecture"; Jun. 8, 2000; version 1.0; Microsoft Corporation, 54 pages.

Apple, Inc., "Welcome. You're watching Apple TV." Apple TV 3rd Generation Setup Guide, Mar. 16, 2012 <<http://manuals.info.apple>.

US 9,967,615 B2

Page 5

(56)

References Cited

OTHER PUBLICATIONS

com/MANUALS/1000/MA1607/en_US/apple_tv_3rd_gen_setup.pdf> Retrieved Oct. 16, 2014, 36 pages.

International Searching Authority, "Written Opinion", issued in connection with PCT Application No. PCT/US2014/039669, dated Sep. 22, 2014, 5 pages.

International Searching Authority, "Written Opinion", issued in connection with PCT Application No. PCT/US2014/034290, dated Aug. 21, 2014, 5 pages.

International Searching Authority, "Written Opinion", issued in connection with PCT Application No. PCT/US2014/034292, dated Aug. 14, 2014, 4 pages.

International Searching Authority, "Written Opinion", issued in connection with PCT Application No. PCT/US2014/034290, dated Aug. 20, 2014, 6 pages.

European Patent Office, "The Extended European Search Report", issued in connection with European patent application No. 12861517.6, dated Jun. 9, 2015, 11 pages.

"Final Office Action dated Aug. 25, 2015, issued in connection with U.S. Appl. No. 13/864,081, filed Apr. 16, 2013, 15 pages."

"Non-Final Office Action dated Aug. 19, 2015, issued in connection with U.S. Appl. No. 13/864,075, filed Apr. 16, 2013, 18 pages."

Final Office Action dated Aug. 28, 2015, issued in connection with U.S. Appl. No. 13/904,936, filed May 29, 2013, 10 pages.

Non-Final Office Action dated Feb. 13, 2015, issued in connection with U.S. Appl. No. 13/904,936, filed May 29, 2013, 10 pages.

Non-Final Office Action dated Mar. 24, 2015, issued in connection with U.S. Appl. No. 13/864,086, filed Apr. 16, 2013, 14 pages.

"Advisory Action dated Sep. 17, 2015, issued in connection with U.S. Appl. No. 14/520,566, filed Oct. 22, 2014, 4 pages."

"Final Office Action dated Sep. 25, 2015, issued in connection with U.S. Appl. No. 13/904,949, filed May 29, 2013, 14 pages."

"Advisory Action dated Oct. 29, 2015, issued in connection with U.S. Appl. No. 13/864,081, filed Apr. 16, 2013, 3 pages."

"Final Office Action dated Oct. 23, 2015, issued in connection with U.S. Appl. No. 13/904,944, filed May 29, 2013, 13 pages."

International Bureau, International Preliminary Report on Patentability, dated Oct. 29, 2015, issued in connection with International Application No. PCT/US2014/034290, filed on Apr. 16, 2014, 7 pages.

International Bureau, International Preliminary Report on Patentability, dated Oct. 29, 2015, issued in connection with International Application No. PCT/US2014/034292, filed on Apr. 16, 2014, 6 pages.

International Bureau, International Preliminary Report on Patentability, dated Oct. 29, 2015, issued in connection with International Application No. PCT/US2014/034372, filed on Apr. 16, 2014, 8 pages.

Notice of Allowance dated Oct. 9, 2015, issued in connection with U.S. Appl. No. 13/864,086, filed Apr. 16, 2013, 14 pages.

Supplemental Notice of Allowability dated Nov. 4, 2015, issued in connection with U.S. Appl. No. 13/864,086, filed Apr. 16, 2013, 2 pages.

Japanese Office Action dated Oct. 20, 2015, issued in connection with Japanese Application No. 2014-550400, 8 pages.

Final Office Action dated Jul. 8, 2015, issued in connection with U.S. Appl. No. 14/520,566, filed Oct. 22, 2014, 8 pages.

Final Office Action dated Jun. 23, 2015, issued in connection with U.S. Appl. No. 13/904,896, filed May 29, 2013, 16 pages.

Advisory Action dated Jun. 16, 2016, issued in connection with U.S. Appl. No. 13/904,896, filed May 29, 2013, 5 pages.

Advisory Action dated Apr. 29, 2016, issued in connection with U.S. Appl. No. 13/864,075, filed Apr. 16, 2013, 3 pages.

Anonymous, "Sonos Controller for Mac or PC Product Guide", Retrieved from the Internet, XP055254086, 2013, 108 pages.

European Patent Office, Exam Report dated Apr. 28, 2016, issued in connection with European Patent Application No. 12861517.6, 6 pages.

European Patent Office, Extended European Search Report dated Jun. 7, 2016, issued in connection with European patent application No. 14803651.0, 10 pages.

Final Office Action dated Jun. 2, 2016, issued in connection with U.S. Appl. No. 14/520,566, filed Oct. 22, 2014, 12 pages.

Final Office Action dated May 19, 2016, issued in connection with U.S. Appl. No. 14/520,578, filed Oct. 22, 2014, 12 pages.

First Action Interview Office Action dated Jun. 20, 2016, issued in connection with U.S. Appl. No. 14/520,578, filed Oct. 22, 2014, 5 pages.

Non-Final Office Action dated Jun. 16, 2016, issued in connection with U.S. Appl. No. 13/904,932, filed May 29, 2013, 15 pages.

Notice of Allowance dated Jun. 6, 2016, issued in connection with U.S. Appl. No. 13/904,944, filed May 29, 2013, 5 pages.

Notice of Allowance dated Jun. 13, 2016, issued in connection with U.S. Appl. No. 13/864,075, filed Apr. 16, 2013, 11 pages.

Non-Final Office Action dated Feb. 2, 2016, issued in connection with U.S. Appl. No. 13/904,936, filed May 29, 2013, 14 pages.

Non-Final Office Action dated Jan. 19, 2016, issued in connection with U.S. Appl. No. 13/341,237, filed Dec. 30, 2011, 10 pages.

Advisory Action dated Feb. 25, 2016, issued in connection with U.S. Appl. No. 13/904,944, filed May 29, 2013, 4 pages.

"Final Office Action dated Mar. 10, 2016, issued in connection with U.S. Appl. No. 13/904,932, filed May 29, 2013, 16 pages".

Notice of Allowance dated Feb. 26, 2016, issued in connection with U.S. Appl. No. 13/864,081, filed Apr. 16, 2013, 13 pages.

Final Office Action dated Mar. 21, 2016, issued in connection with U.S. Appl. No. 13/904,896, filed May 29, 2013, 19 pages.

Non-Final Office Action dated Mar. 17, 2016, issued in connection with U.S. Appl. No. 13/904,923, filed May 29, 2013, 15 pages.

Non-Final Office Action dated Mar. 25, 2016, issued in connection with U.S. Appl. No. 13/904,949, filed May 29, 2013, 13 pages.

Chen et al., "What a Juke! A Collaborative Music Sharing System," World of Wireless, Mobile and Multimedia Networks (WOWMOM), 2012 IEEE International Symposium, 2012, 6 pages.

Corrected Notice of Allowance dated Oct. 6, 2016, issued in connection with U.S. Appl. No. 13/904,949, filed May 29, 2013, 9 pages.

European Patent Office, Extended European Search Report dated Sep. 9, 2016, issued in connection with European patent application No. 14785247.9, 10 pages.

European Patent Office, Extended European Search Report dated Oct. 18, 2016, issued in connection with European patent application No. 14785806.2, 9 pages.

Final Office Action dated Sep. 21, 2016, issued in connection with U.S. Appl. No. 13/904,923, filed May 29, 2013, 19 pages.

Notice of Allowance dated Nov. 7, 2016, issued in connection with U.S. Appl. No. 14/520,578, filed Oct. 22, 2014, 14 pages.

Notice of Allowance dated Sep. 20, 2016, issued in connection with U.S. Appl. No. 13/904,949, filed May 29, 2013, 12 pages.

European Patent Office, Extended European Search Report dated Aug. 1, 2016, issued in connection with European patent application No. 16160758.5, 11 pages.

Final Office Action dated Aug. 24, 2016, issued in connection with U.S. Appl. No. 13/341,237, filed Dec. 30, 2011, 12 pages.

Final Office Action dated Aug. 29, 2016, issued in connection U.S. Appl. No. 13/904,936, filed May 29, 2013, 21 pages.

International Searching Authority, International Report on Patentability dated Dec. 10, 2015, issued in connection with International Application No. PCT/US2014/039669, filed May 28, 2014, 7 pages.

Japanese Patent Office, Japanese Office Action dated Jul. 12, 2016, issued in connection with Japanese Application No. 2014-550400, 10 pages.

Non-Final Office Action dated Aug. 12, 2016, issued in connection with U.S. Appl. No. 13/904,909, filed May 29, 2013, 21 pages.

Notice of Allowance dated Aug. 31, 2016, issued in connection with U.S. Appl. No. 14/520,566, filed Oct. 22, 2014, 7 pages.

Ritchie et al., "UPnP AV Architecture:2 for UPnP Version 1.0", 2010, XP055032201, retrieved from the internet: URL: http://upnp.org/specs/av/UPnP-av_AVArchitecture-v2.pdf, 11 pages.

Advisory Action dated Dec. 5, 2016, issued in connection with U.S. Appl. No. 13/904,923, filed May 29, 2013, 5 pages.

US 9,967,615 B2

Page 6

(56)

References Cited**OTHER PUBLICATIONS**

Canadian Patent Office, Canadian Office Action dated Nov. 3, 2016, issued in connection with Canadian Application No. 2,861,790, 4 pages.

European Patent Office, Extended European Search Report dated Nov. 21, 2016, issued in connection with European Application No. 14784965.7-1870, 6 pages.

European Patent Office, Summons to Attend Oral Proceedings dated Dec. 1, 2016, issued in connection with European Application No. 12861517.6-1905, 11 pages.

Japanese Patent Office, Notice of Rejection dated Dec. 20, 2016, issued in connection with Japanese Application No. 2016-509069, 4 pages.

"Denon 2003-2004 Product Catalog," Denon, 2003-2004, 44 pages.

Mate et al., "Movable-Multimedia: Session Mobility in Ubiquitous Computing Ecosystem", XP055019030, 2006, 6 pages.

Non-Final Office Action dated Dec. 14, 2016, issued in connection with U.S. Appl. No. 13/341,237, filed Dec. 30, 2011, 5 pages.

Notice of Allowance dated Nov. 17, 2016, issued in connection with U.S. Appl. No. 13/904,949, filed May 29, 2013, 12 pages.

Notice of Allowance dated Nov. 23, 2016, issued in connection with U.S. Appl. No. 13/904,896, filed May 29, 2013, 18 pages.

Notice of Allowance dated Nov. 23, 2016, issued in connection with U.S. Appl. No. 13/904,932, filed May 29, 2013, 5 pages.

Notification of Reopening of Prosecution Due to Consideration of an Information Disclosure Statement Filed after Mailing of a Notice of Allowance dated Jan. 20, 2017, issued in connection with U.S. Appl. No. 14/520,566, filed Oct. 22, 2014, 2 pages.

Supplemental Notice of Allowance dated Dec. 21, 2016, issued in connection with U.S. Appl. No. 13/904,949, filed May 29, 2013, 2 pages.

United States Patent and Trademark Office, U.S. Appl. No. 60/490,768, filed Jul. 28, 2003, entitled "Method for synchronizing audio playback between multiple networked devices," 13 pages.

United States Patent and Trademark Office, U.S. Appl. No. 60/825,407, filed Sep. 12, 2003, entitled "Controlling and manipulating groupings in a multi-zone music or media system," 82 pages.

Yamaha DME 64 Owner's Manual; copyright 2004, 80 pages.

Yamaha DME Designer 3.5 setup manual guide; copyright 2004, 16 pages.

Yamaha DME Designer 3.5 User Manual; Copyright 2004, 507 pages.

Australian Patent Office, Examination Report dated Mar. 22, 2017, issued in connection with Australian Application No. 2016202175, 3 pages.

Chen, Zhaofei et al. "What a Juke! A Collaborative Music Sharing System", World of Wireless, Mobile and Multimedia Networks (WOWMOM), 2012 IEEE International Symposium on A, IEEE, Jun. 25, 2012 6 pages.

Chinese Patent Office, Chinese Office Action dated Jan. 5, 2017, issued in connection with Chinese Application No. 201280069674.6, 14 pages.

European Patent Office, European Extended Search Report dated Aug. 16, 2017, issued in connection with EP Application No. 16160758.5, 9 pages.

European Patent Office, Office Action dated Apr. 7, 2017, issued in connection with European Application No. 14803651.0, 4 pages.

European Patent Office, Office Action dated May 11, 2017, issued in connection with European Application No. 14785247.9, 9 pages.

Final Office Action dated May 15, 2017, issued in connection with U.S. Appl. No. 14/520,566, filed Oct. 22, 2014, 12 pages.

Final Office Action dated Sep. 20, 2017, issued in connection with U.S. Appl. No. 13/904,936, filed May 29, 2013, 22 pages.

Japanese Patent Office, Non-Final Office Action dated Mar. 28, 2017, issued in connection with Japanese Patent Application No. 2016-516750, 5 pages.

Japanese Patent Office, Office Action dated Jan. 10, 2017, issued in connection with Japanese Patent Application No. 2016-509046, 7 pages.

Japanese Patent Office, Office Action dated Feb. 14, 2017, issued in connection with Japanese Patent Application No. 2016-509047, 9 pages.

Non-Final Office Action dated Feb. 23, 2017, issued in connection with U.S. Appl. No. 13/904,923, filed May 29, 2013, 21 pages.

Non-Final Office Action dated Feb. 7, 2017, issued in connection with U.S. Appl. No. 14/520,578, filed Oct. 22, 2014, 5 pages.

Non-Final Office Action dated Mar. 9, 2017, issued in connection with U.S. Appl. No. 13/904,936, filed May 29, 2013, 20 pages.

Non-Final Office Action dated Feb. 22, 2017, issued in connection with U.S. Appl. No. 14/520,566, filed Oct. 22, 2014, 14 pages.

Non-Final Office Action dated Jul. 26, 2017, issued in connection with U.S. Appl. No. 14/520,578, filed Oct. 22, 2014, 10 pages.

Notice of Allowance dated Apr. 4, 2017, issued in connection with U.S. Appl. No. 13/904,932, filed May 29, 2013, 5 pages.

Notice of Allowance dated Mar. 9, 2017, issued in connection with U.S. Appl. No. 13/904,949, filed May 29, 2013, 13 pages.

Notice of Allowance dated Aug. 17, 2017, issued in connection with U.S. Appl. No. 13/904,923, filed May 29, 2013, 23 pages.

Notice of Allowance dated Aug. 21, 2017, issued in connection with U.S. Appl. No. 14/520,566, filed Oct. 22, 2014, 7 pages.

Notice of Allowance dated Jan. 25, 2017, issued in connection with U.S. Appl. No. 13/341,237, filed Dec. 30, 2011, 7 pages.

Notice of Allowance dated Jun. 28, 2017, issued in connection with U.S. Appl. No. 13/904,896, filed May 29, 2013, 17 pages.

* cited by examiner

U.S. Patent

May 8, 2018

Sheet 1 of 11

US 9,967,615 B2

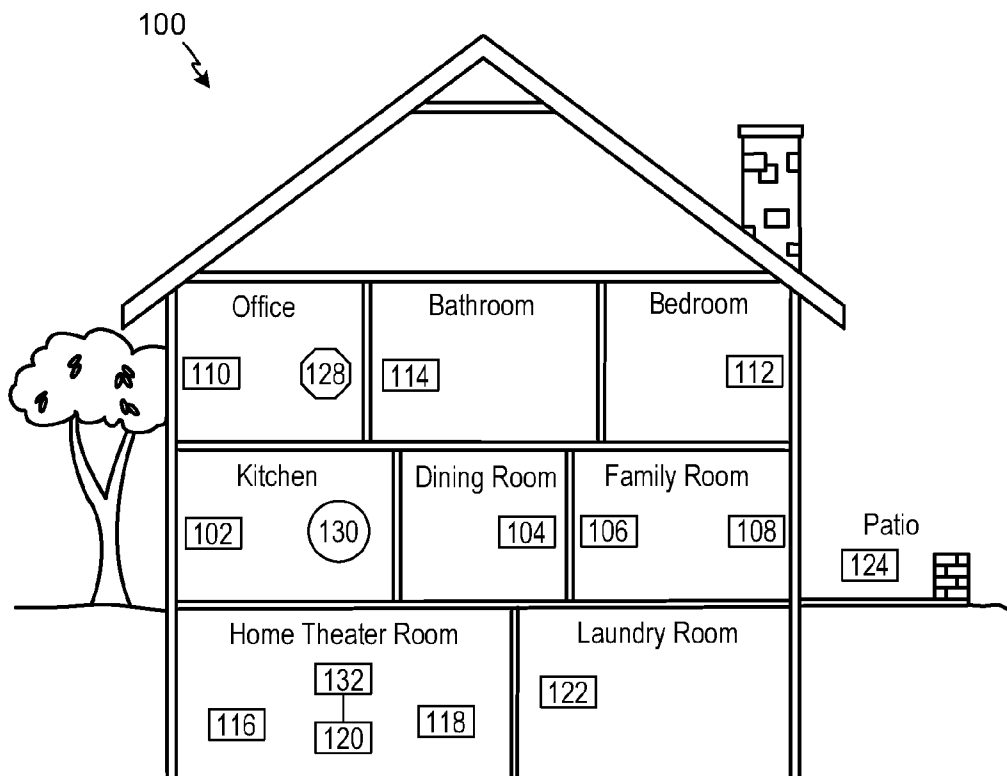


FIGURE 1

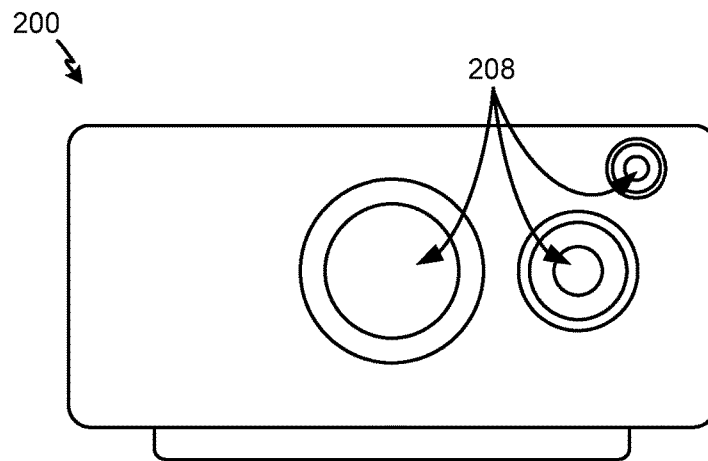


FIGURE 2A

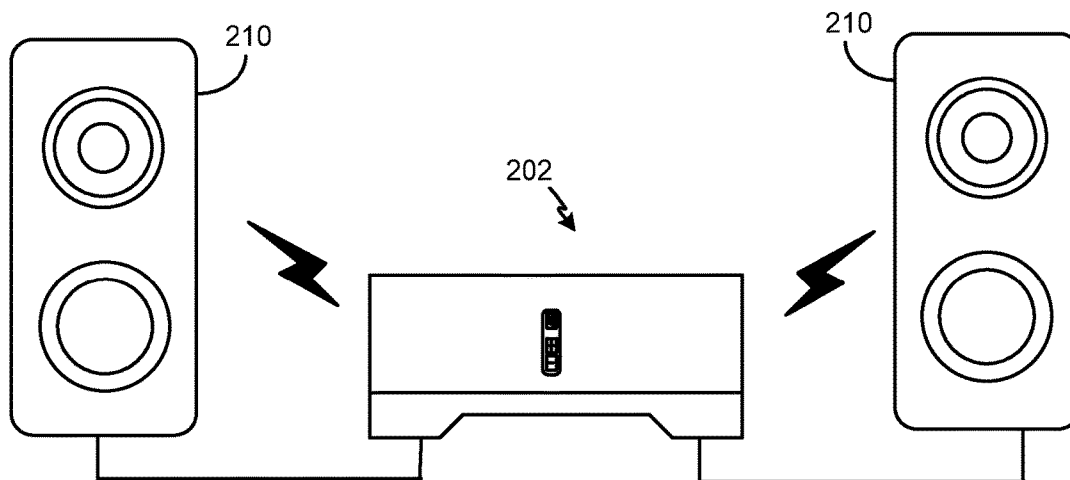


FIGURE 2B

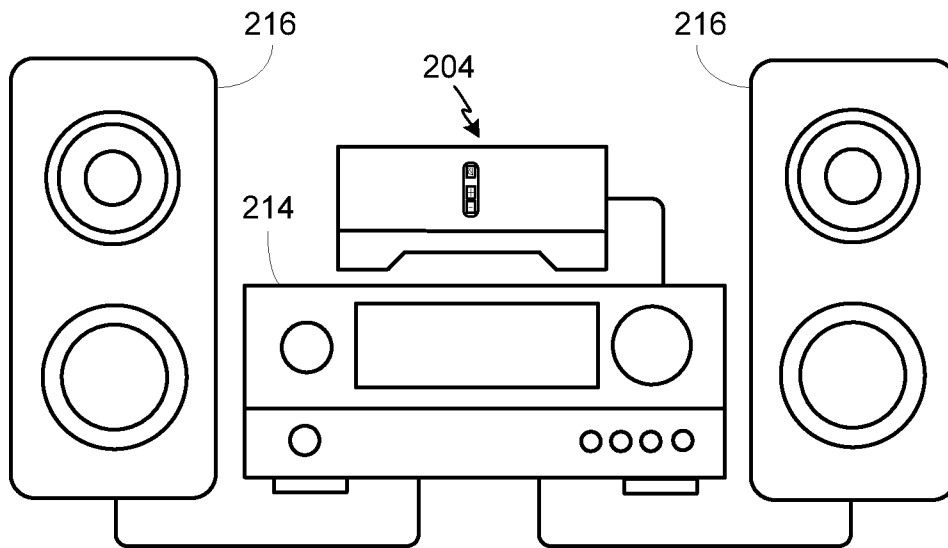


FIGURE 2C

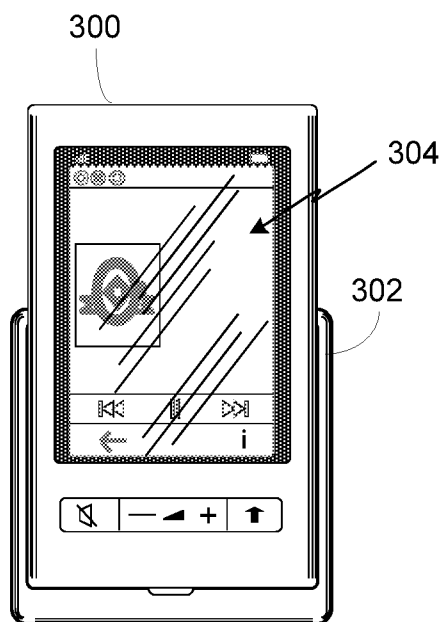


FIGURE 3

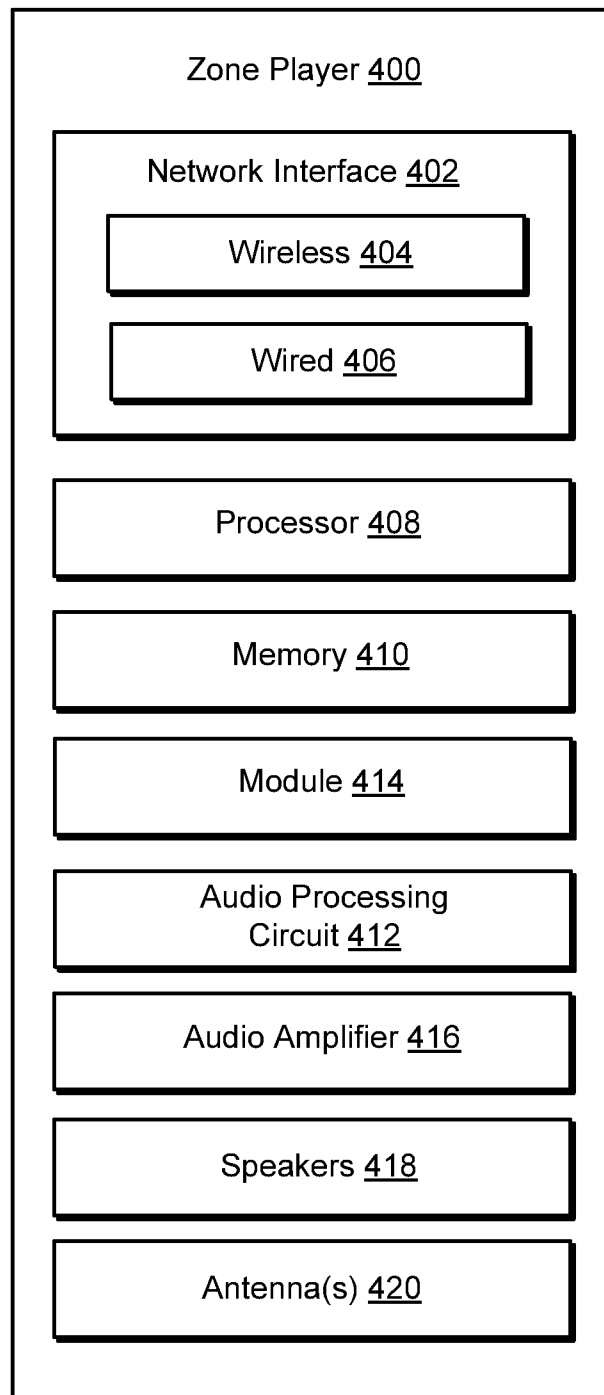


FIGURE 4

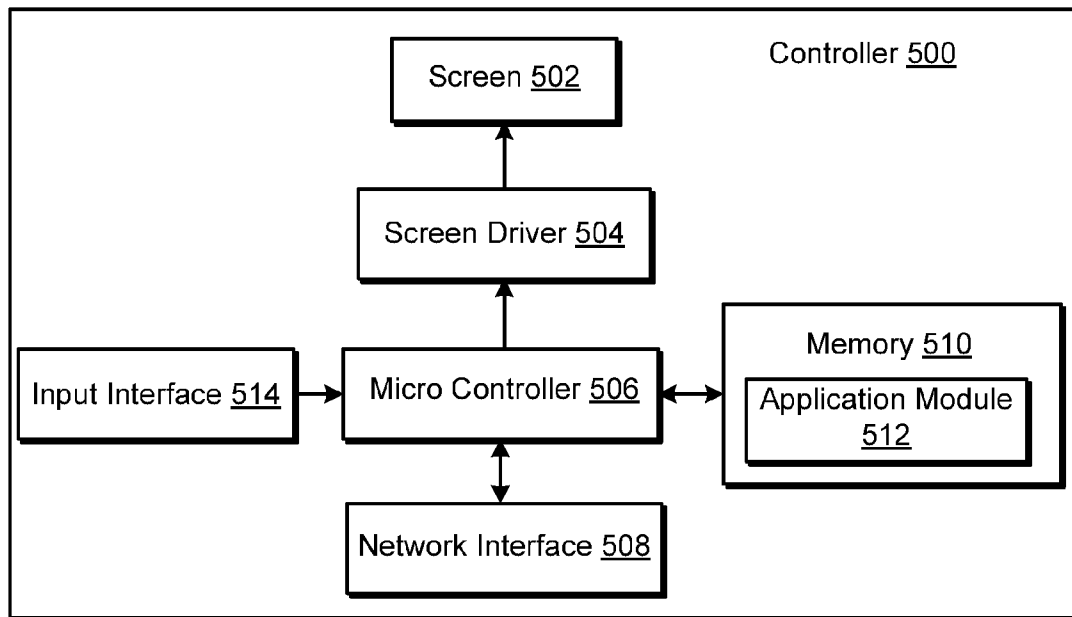


FIGURE 5

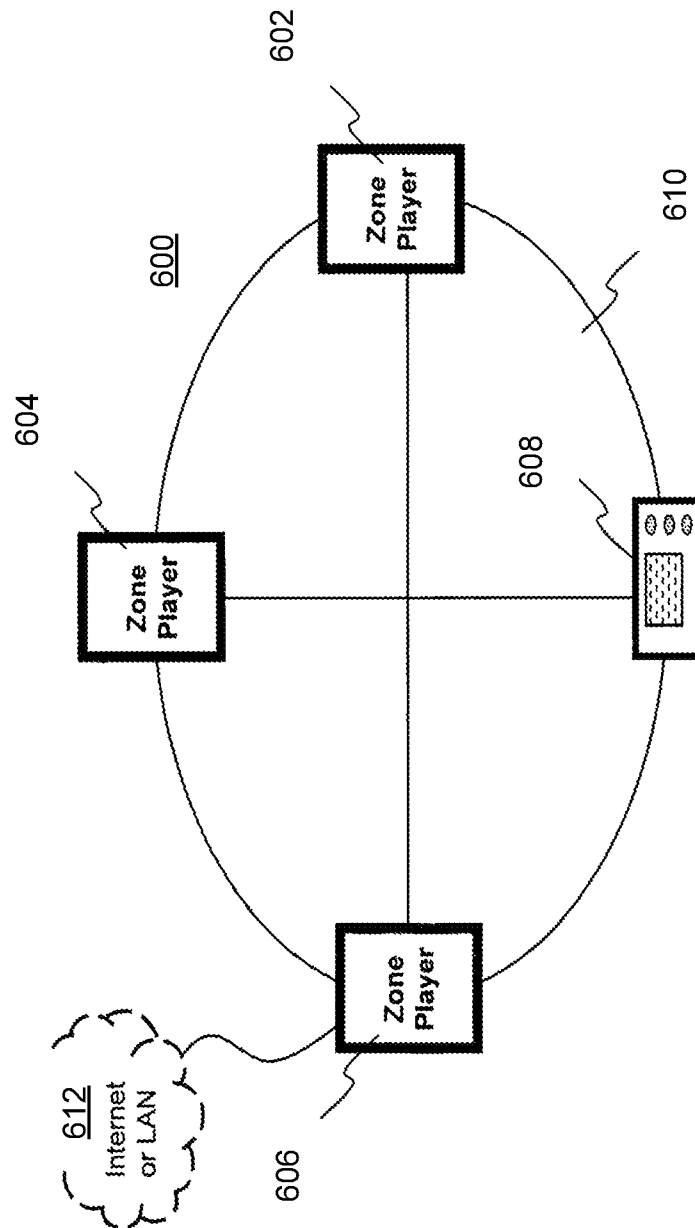


FIGURE 6

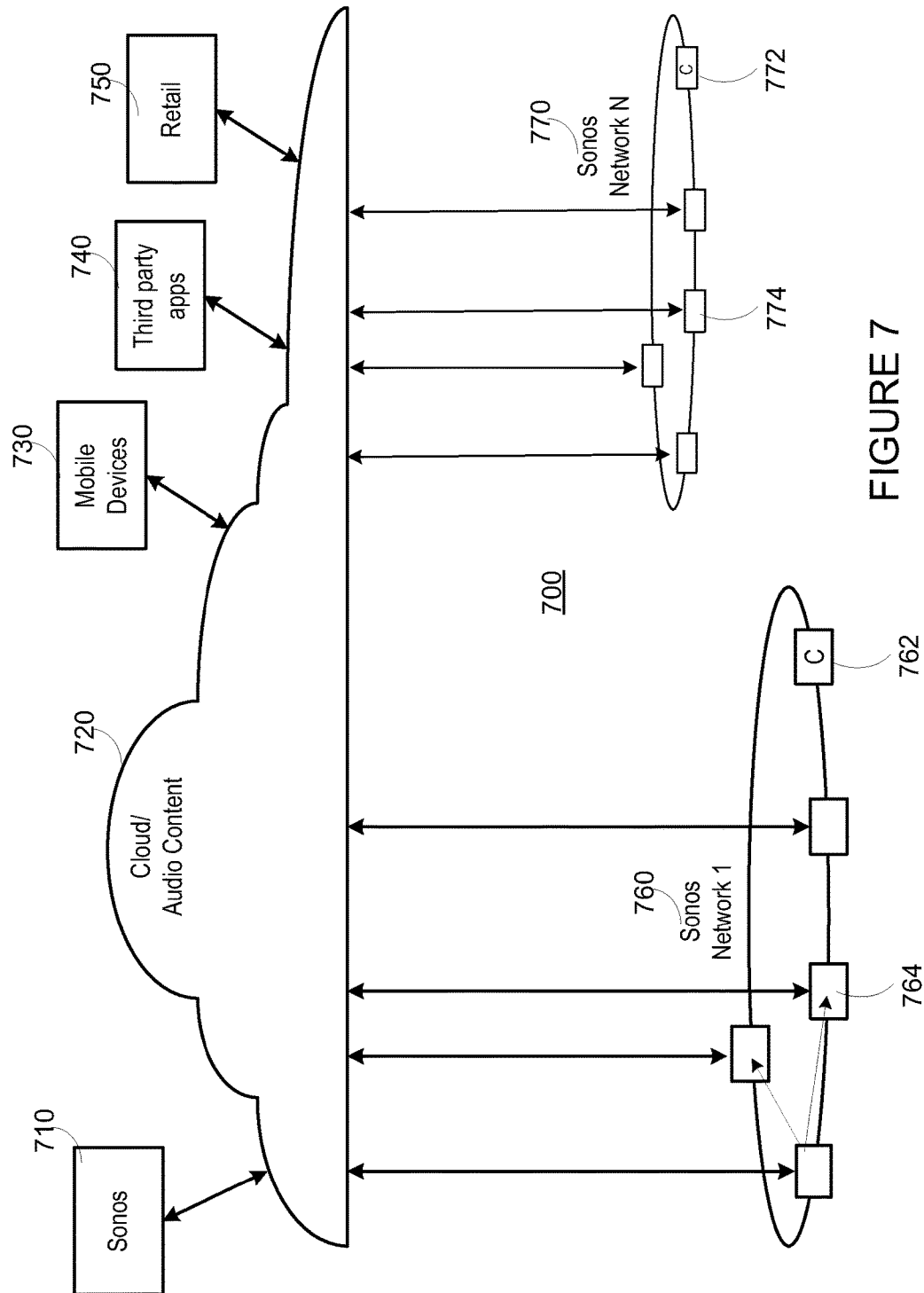


FIGURE 7

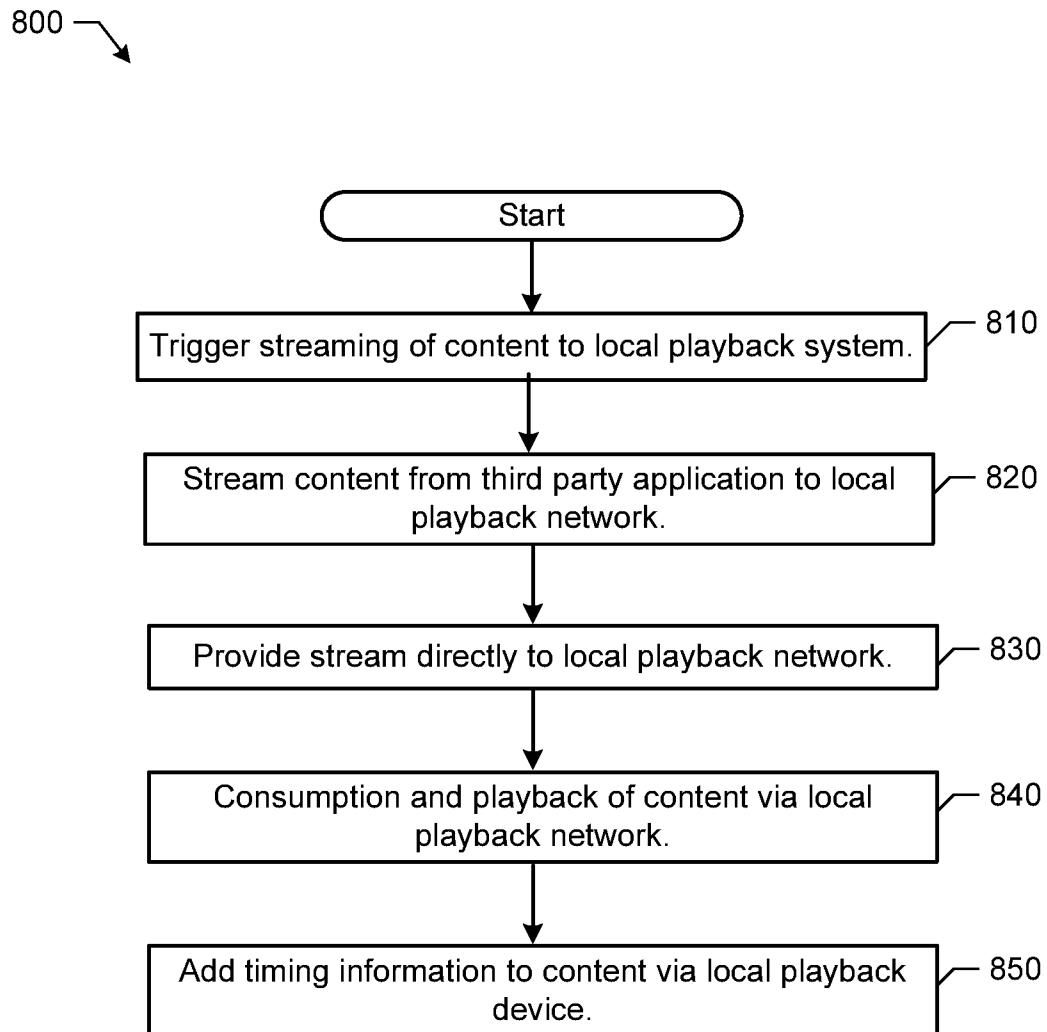


FIGURE 8

900 ↘

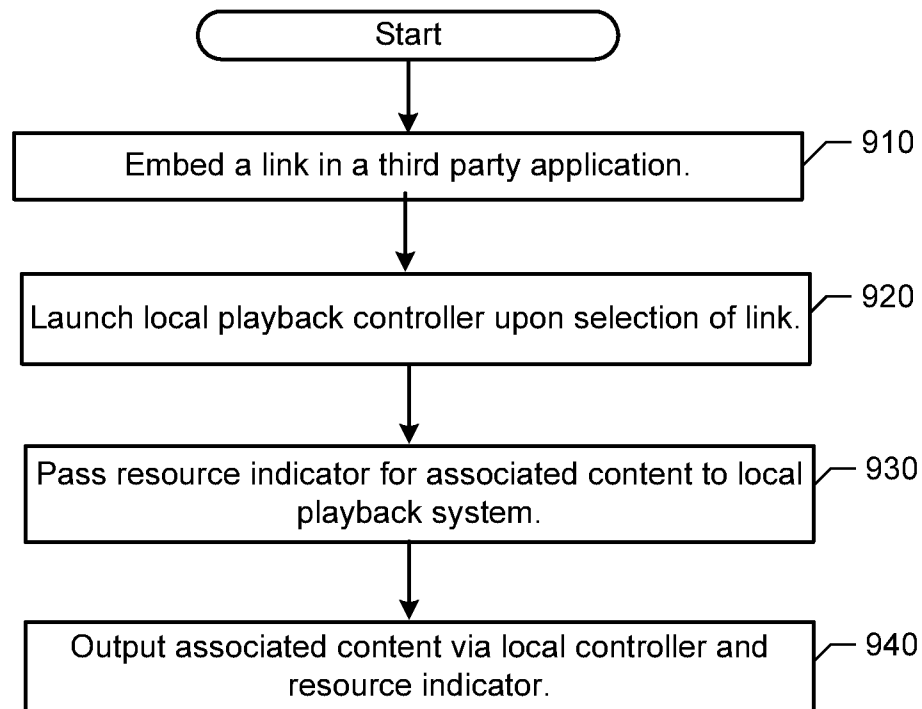


FIGURE 9

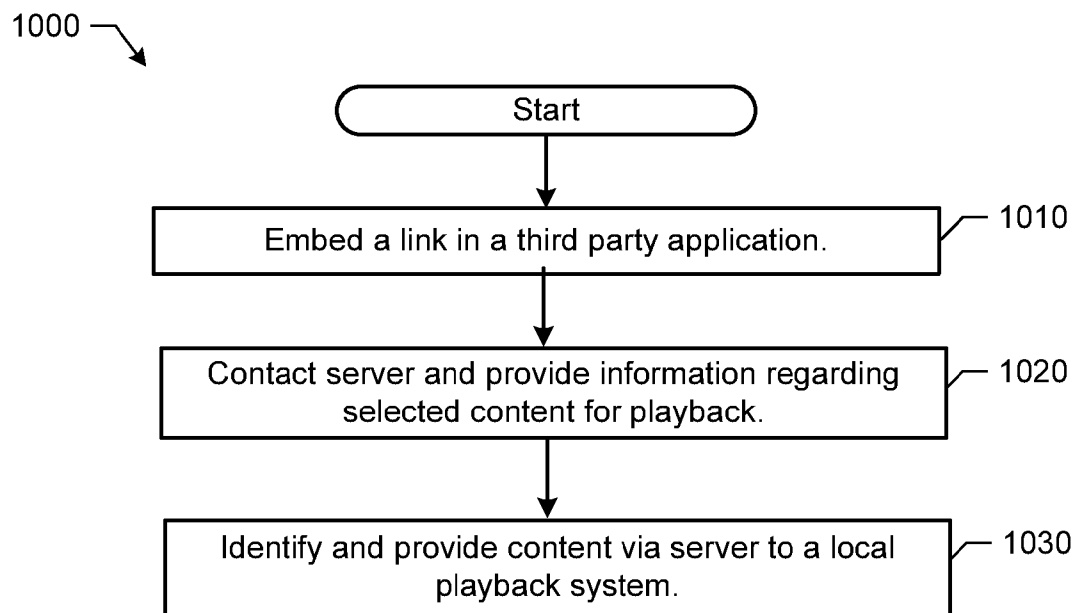


FIGURE 10

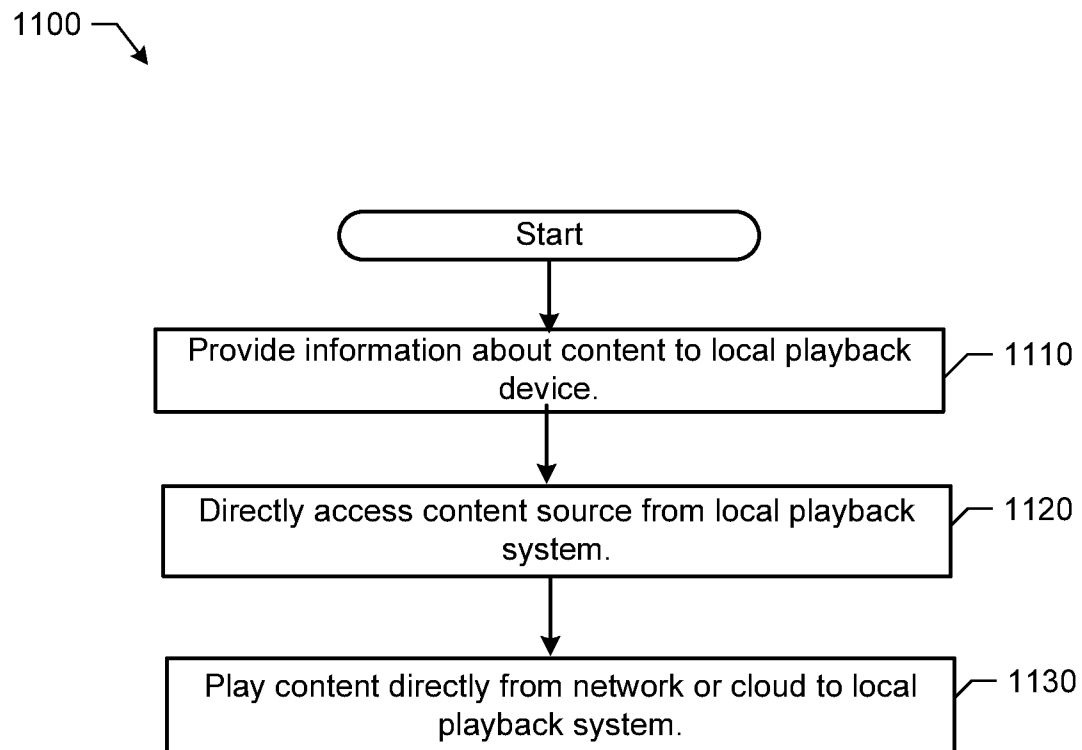


FIGURE 11

US 9,967,615 B2

1

NETWORKED MUSIC PLAYBACK**CROSS-REFERENCE TO RELATED APPLICATIONS**

The present application claims the benefit of priority to U.S. Non-Provisional application Ser. No. 13/341,237, filed on Dec. 30, 2011, entitled "Systems and Methods for Networked Music Playback", which is hereby incorporated by reference in its entirety for all purposes.

FIELD OF THE DISCLOSURE

The disclosure is related to consumer electronics and, more particularly, to providing music for playback via one or more devices on a playback data network.

BACKGROUND

Technological advancements have increased the accessibility of music content, as well as other types of media, such as television content, movies, and interactive content. For example, a user can access audio, video, or both audio and video content over the Internet through an online store, an Internet radio station, an online music service, an online movie service, and the like, in addition to the more traditional avenues of accessing audio and video content. Demand for such audio and video content continues to surge. Given the high demand, technology used to access and play such content has likewise improved.

BRIEF DESCRIPTION OF THE DRAWINGS

Features, aspects, and advantages of the presently disclosed technology are better understood with regard to the following description, appended claims, and accompanying drawings where:

FIG. 1 shows an illustration of an example system in which embodiments of the methods and apparatus disclosed herein can be implemented;

FIG. 2A shows an illustration of an example zone player having a built-in amplifier and speakers;

FIG. 2B shows an illustration of an example zone player having a built-in amplifier and connected to external speakers;

FIG. 2C shows an illustration of an example zone player connected to an A/V receiver and speakers;

FIG. 3 shows an illustration of an example controller;

FIG. 4 shows an internal functional block diagram of an example zone player;

FIG. 5 shows an internal functional block diagram of an example controller;

FIG. 6 shows an example ad-hoc playback network;

FIG. 7 shows a system including a plurality of networks including a cloud-based network and at least one local playback network; and

FIGS. 8-11 show flow diagrams for methods to provide audio content to a local playback system.

In addition, the drawings are for the purpose of illustrating example embodiments, but it is understood that the present disclosure is not limited to the arrangements and instrumentality shown in the drawings.

DETAILED DESCRIPTION**I. Overview**

Wired or wireless networks can be used to connect one or more multimedia playback devices for a home or other

2

location playback network (e.g., a home music system). Certain examples provide automatic configuration of parameters of a playback device to be coupled to a network with reduced or minimum human intervention. For example, a wired and/or wireless ad-hoc network is established to facilitate communications among a group of devices. Music and/or other multimedia content can be shared among devices and/or groups of devices (also referred to herein as zones) associated with a playback network.

Certain embodiments facilitate streaming or otherwise providing music from a music-playing application (e.g., browser-based application, native music player, other multimedia application, and so on) to a multimedia content playback (e.g., Sonos™) system. Certain embodiments provide simple, easy-to-use and secure systems and methods for multimedia content playback across a plurality of systems and locations. Certain embodiments facilitate integration between content partners and a playback system as well as supporting maintenance of such content and system.

Although the following discloses example systems, methods, apparatus, and articles of manufacture including, among other components, firmware and/or software executed on hardware, it should be noted that such systems, methods, apparatus, and/or articles of manufacture are merely illustrative and should not be considered as limiting. For example, it is contemplated that any or all of these firmware, hardware, and/or software components could be embodied exclusively in hardware, exclusively in software, exclusively in firmware, or in any combination of hardware, software, and/or firmware. Accordingly, while the following describes example systems, methods, apparatus, and/or articles of manufacture, the examples provided are not the only way(s) to implement such systems, methods, apparatus, and/or articles of manufacture.

When any of the appended claims are read to cover a purely software and/or firmware implementation, at least one of the elements in at least one example is hereby expressly defined to include a tangible medium such as a memory, DVD, CD, Blu-ray, and so on, storing the software and/or firmware.

Reference herein to "embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment can be included in at least one example embodiment of the invention. The appearances of this phrase in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments. As such, the embodiments described herein, explicitly and implicitly understood by one skilled in the art, can be combined with other embodiments.

Certain embodiments provide a method to provide content to a local playback network. The example method includes identifying multimedia content from a content provider. The example method includes passing information regarding the multimedia content to a local playback system including one or more multimedia playback devices in response to a trigger. The example method includes facilitating play of the multimedia content via a local playback network associated with the local playback system.

Certain embodiments provide a computer readable storage medium including instructions for execution by a processor, the instructions, when executed, cause the processor to implement a method to provide content to a local playback network. The example method includes identifying multimedia content from a content provider. The example method includes passing information regarding the multimedia content to a local playback system including one or

more multimedia playback devices in response to a trigger. The example method includes facilitating play of the multimedia content via a local playback network associated with the local playback system.

Certain embodiments provide a multimedia playback device including a wireless communication interface to communicate with a local playback network and a multimedia content source and a processor. The process is to identify multimedia content from the multimedia content source; pass information regarding the multimedia content to device on the local playback network in response to a trigger; and facilitate play of the multimedia content via the devices on the local playback network.

II. Example Environment

Referring now to the drawings, in which like numerals can refer to like parts throughout the figures, FIG. 1 shows an example system configuration 100 in which one or more of the method and/or apparatus disclosed herein can be practiced or implemented. By way of illustration, the system configuration 100 represents a home with multiple zones. Each zone, for example, represents a different room or space, such as an office, bathroom, bedroom, kitchen, dining room, family room, home theater room, utility or laundry room, and patio. While not shown here, a single zone can cover more than one room or space. One or more of zone players 102-124 are shown in each respective zone. A zone player 102-124, also referred to as a playback device, multimedia unit, speaker, and so on, provides audio, video, and/or audiovisual output. A controller 130 (e.g., shown in the kitchen for purposes of illustration) provides control to the system configuration 100. The system configuration 100 illustrates an example whole house audio system, though it is understood that the technology described herein is not limited to its particular place of application or to an expansive system like a whole house audio system 100 of FIG. 1.

FIGS. 2A, 2B, and 2C show example illustrations of zone players 200-204. The zone players 200-204 of FIGS. 2A, 2B, and 2C, respectively, can correspond to any of the zone players 102-124 of FIG. 1. While certain embodiments provide multiple zone players, an audio output can be generated using only a single zone player. FIG. 2A illustrates a zone player 200 including sound producing equipment 208 capable of generating sound or an audio output corresponding to a signal received (e.g., wirelessly and/or via a wired interface). The sound producing equipment 208 of the zone player 200 of FIG. 2A includes a built-in amplifier (not shown in this illustration) and speakers (e.g., a tweeter, a mid-range driver, and/or a subwoofer). In certain embodiments, the zone player 200 of FIG. 2A can be configured to play stereophonic audio or monaural audio. In some embodiments, the zone player 200 of FIG. 2A can be configured as a component in a combination of zone players to play stereophonic audio, monaural audio, and/or surround audio. As described in greater detail below, in some embodiments, the example zone player 200 of FIG. 2A can also transmit a second signal to, for example, other zone player(s) in the same or different zone(s), speaker(s), receiver(s), and so on. Transmission of the second signal can be part of, for example, a system in which multiple zone players, speakers, receivers, and so on, form a network to, for example, present media content in a synchronization or distributed manner.

The example zone player 202 of FIG. 2B includes a built-in amplifier (not shown in this illustration) to power a set of detached speakers 210. The speakers 210 of FIG. 2B

can include, for example, any type of loudspeaker. The zone player 202 of FIG. 2B can communicate a signal corresponding to audio content to the detached speakers 210 via wired and/or wireless channels. Instead of receiving and generating audio content as in FIG. 2A, the zone player 202 of FIG. 2B receives the audio content and transmits the same (e.g., after processing the received signal) to the detached speakers 210. Similar to the example zone player 200 of FIG. 2A, in some embodiments the zone player 202 can transmit a second signal to, for example, other zone player(s) in the same or different zone(s), speaker(s), receiver(s), and so on.

The example zone player 204 of FIG. 2C does not include an amplifier, but allows a receiver 214, or another audio and/or video type device with built-in amplification, to connect to a data network 128 of FIG. 1 and to play audio received over the data network 128 via the receiver 214 and a set of detached speakers 216. In addition to the wired couplings shown in FIG. 2C, the detached speakers 216 can receive audio content via a wireless communication channel between the detached speakers 216 and, for example, the zone player 204 and/or the receiver 214. In some embodiments the zone player 202 can transmit a second signal to, for example, other zone player(s) in the same or different zone(s), speaker(s), receiver(s), and so on.

Example zone players include a "Sonos S5," "Sonos Play:5," "Sonos Play:3," "ZonePlayer 120," and "ZonePlayer 90," which are offered by Sonos, Inc. of Santa Barbara, Calif. Any other past, present, and/or future zone players can additionally or alternatively be used to implement the zone players of example embodiments disclosed herein. A zone player can also be referred to herein as a playback device, and a zone player is not limited to the particular examples illustrated in FIGS. 2A, 2B, and 2C. For example, a zone player can include a wired or wireless headphone. In other examples, a zone player might include a subwoofer. In yet other examples, a zone player can include a sound bar. In an example, a zone player can include or interact with a docking station for an Apple iPod™ or similar device. In some embodiments, a zone player can relay one or more signals received from, for example, a first zone player to another playback device. In some embodiments, a zone player can receive a first signal and generate an output corresponding to the first signal and, simultaneously or separately, can receive a second signal and transmit or relay the second signal to another zone player(s), speaker(s), receiver(s), and so on. Thus, an example zone player described herein can act as a playback device and, at the same time, operate as a hub in a network of zone players. In such instances, media content corresponding to the first signal can be different from the media content corresponding to the second signal.

FIG. 3 shows an example illustration of a wireless controller 300 in a docking station 302. The controller 300 can correspond to the controlling device 130 of FIG. 1. The controller 300 is provided with a touch screen 304 that allows a user to interact with the controller 300, for example, to retrieve and navigate a playlist of audio items, control operations of one or more zone players, and provide overall control of the system configuration 100. In certain embodiments, any number of controllers can be used to control the system configuration 100. In certain embodiments, there can be a limit on the number of controllers that can control the system configuration 100. The controllers might be wireless like wireless controller 300 or wired to the data network 128. Furthermore, an application running on any network-enabled portable devices, such as an iPhone™ iPad™

US 9,967,615 B2

5

Android™ powered phone, or any other smart phone or network-enabled device can be used as a controller by connecting to the data network 128. An application running on a laptop or desktop PC or Mac can also be used as a controller. Example controllers include a “Sonos® Controller 200,” “Sonos® Controller for iPhone,” “Sonos® Controller for iPad,” “Sonos® Controller for Android,” “Sonos® Controller for Mac or PC,” which are offered by Sonos, Inc. of Santa Barbara, Calif. The flexibility of such an application and its ability to be ported to a new type of portable device is advantageous.

Referring back to the system configuration 100 of FIG. 1, a particular zone can contain one or more zone players. For example, the family room of FIG. 1 contains two zone players 106 and 108, while the kitchen is shown with one zone player 102. Zones can be dynamically configured by positioning a zone player in a room or space and assigning via the controller 130 the zone player to a new or existing zone. As such, zones can be created, combined with another zone, removed, and given a specific name (e.g., “Kitchen”), if so programmed. The zone players 102 to 124 are coupled directly or indirectly to a data network, such as the data network 128 shown in FIG. 1. The data network 128 is represented by an octagon in the figure to stand out from other components shown in the figure. While the data network 128 is shown in a single location, it is understood that such a network can be distributed in and around the system configuration 100.

Particularly, the data network 128 can be a wired network, a wireless network, or a combination of both. In some embodiments, one or more of the zone players 102-124 are wirelessly coupled to the data network 128 based on a proprietary mesh network. In some embodiments, one or more of the zone players 102-124 are wirelessly coupled to the data network 128 using a non-mesh topology. In some embodiments, one or more of the zone players 102-124 are coupled via a wire to the data network 128 using Ethernet or similar technology. In addition to the one or more zone players 102-124 connecting to the data network 128, the data network 128 can further allow access to a wide area network, such as the Internet.

In certain embodiments, the data network 128 can be created by connecting any of the zone players 102-124, or some other connecting device, to a broadband router. Other zone players 102-124 can then be added wired or wirelessly to the data network 128. For example, a zone player (e.g., any of zone players 102-124) can be added to the system configuration 100 by simply pressing a button on the zone player itself, which enables a connection to be made to the data network 128. The broadband router can be connected to an Internet Service Provider (ISP), for example. The broadband router can be used to form another data network within the system configuration 100, which can be used in other applications (e.g., web surfing). The data network 128 can also be used in other applications, if so programmed. Further, in certain embodiments, the data network 128 is the same network used for other applications in the household.

In certain embodiments, each zone can play from the same audio source as another zone or each zone can play from a different audio source. For example, someone can be grilling on the patio and listening to jazz music via zone player 124, while someone is preparing food in the kitchen and listening to classical music via zone player 102. Further, someone can be in the office listening to the same jazz music via zone player 110 that is playing on the patio via zone player 124. In some embodiments, the jazz music played via zone players 110 and 124 is played in synchrony. Synchrony-

6

nizing playback amongst zones allows for someone to pass through zones while seamlessly listening to the audio. Further, zones can be put into a “party mode” such that all associated zones will play audio in synchrony.

In certain embodiments, a zone contains two or more zone players. For example, the family room contains two zone players 106 and 108, and the home theater room contains at least zone players 116, 118, and 120. A zone can be configured to contain as many zone players as desired, and for example, the home theater room might contain additional zone players to play audio from a 5.1 channel or greater audio source (e.g., a movie encoded with 5.1 or greater audio channels). If a zone contains two or more zone players, such as the two zone players 106 and 108 in the family room, then the two zone players 106 and 108 can be configured to play the same audio source in synchrony, or the two zone players 106 and 108 can be paired to play two separate sounds in left and right channels, for example. In other words, the stereo effects of a sound can be reproduced or enhanced through the two zone players 106 and 108, one for the left sound and the other for the right sound. In certain embodiments, paired zone players can play audio in synchrony with other zone players.

In certain embodiments, three or more zone players can be configured to play various channels of audio that is encoded with three channels or more sound. For example, the home theater room shows zone players 116, 118, and 120. If the sound is encoded as 2.1 channel audio, then the zone player 116 can be configured to play left channel audio, the zone player 118 can be configured to play right channel audio, and the zone player 120 can be configured to play bass frequencies. Other configurations are possible and depend on the number of zone players and the type of audio. Further, a particular zone can be configured to play a 5.1 channel audio in one instance, such as when playing audio from a movie, and then dynamically switch to play stereo, such as when playing audio from a two channel source.

In certain embodiments, two or more zone players can be sonically consolidated to form a single, consolidated zone player. A consolidated zone player (though made up of multiple, separate devices) can be configured to process and reproduce sound differently than an unconsolidated zone player or zone players that are paired, because a consolidated zone player will have additional speaker drivers from which sound can be passed. The consolidated zone player can further be paired with a single zone player or yet another consolidated zone player. Each playback device of a consolidated playback device is preferably set in a consolidated mode.

According to some embodiments, one can continue to do any of: group, consolidate, and pair zone players, for example, until a desired configuration is complete. The actions of grouping, consolidation, and pairing are preferably performed through a control interface, such as using controller 130, and not by physically connecting and reconnecting speaker wire, for example, to individual, discrete speakers to create different configurations. As such, certain embodiments described herein provide a more flexible and dynamic platform through which sound reproduction can be offered to the end-user.

Sources of audio content to be played by zone players 102-124 are numerous. Music from a personal library stored on a computer or networked-attached storage (NAS) can be accessed via the data network 128 and played. Internet radio stations, shows, and podcasts can be accessed via the data network 128. Music services that let a user stream and download music and audio content can be accessed via the

US 9,967,615 B2

7

data network 128. Further, music can be obtained from traditional sources, such as a turntable or CD player, via a line-in connection to a zone player, for example. Audio content can also be accessed through AirPlay™ wireless technology by Apple, Inc., for example. Audio content received from one or more sources can be shared amongst the zone players 102 to 124 via the data network 128 and/or the controller 130. The above-disclosed sources of audio content are referred to herein as network-based audio information sources. However, network-based audio information sources are not limited thereto.

The example home theater zone players 116, 118, 120 are coupled to an audio information source such as a television 132. In some examples, the television 132 is used as a source of audio for the home theater zone players 116, 118, 120, while in other examples audio information from the television 132 can be shared with any of the zone players 102-124 in the audio system 100.

III. Example Playback Device

Referring now to FIG. 4, there is shown an example functional block diagram of a zone player 400 in accordance with an embodiment. The zone player 400 of FIG. 4 includes a network interface 402, a processor 408, a memory 410, an audio processing component 412, a module 414, an audio amplifier 416, and a speaker unit 418 coupled to the audio amplifier 416. FIG. 2A shows an example illustration of such a zone player. Other types of zone players can not include the speaker unit 418 (e.g., such as shown in FIG. 2B) or the audio amplifier 416 (e.g., such as shown in FIG. 2C). Further, it is contemplated that the zone player 400 can be integrated into another component. For example, the zone player 400 could be constructed as part of a lamp for indoor or outdoor use.

Referring back to FIG. 4, the network interface 402 facilitates a data flow between zone players and other devices on a data network (e.g., the data network 128 of FIG. 1) and the zone player 400. In some embodiments, the network interface 402 can manage the assembling of an audio source or file into smaller packets that are to be transmitted over the data network or reassembles received packets into the original source or file. In some embodiments, the network interface 402 can further handle the address part of each packet so that it gets to the right destination or intercepts packets destined for the zone player 400. Accordingly, in certain embodiments, each of the packets includes an Internet Protocol (IP)-based source address as well as an IP-based destination address.

In some embodiments, the network interface 402 can include one or both of a wireless interface 404 and a wired interface 406. The wireless interface 404, also referred to as an RF interface, provides network interface functions for the zone player 400 to wirelessly communicate with other devices (e.g., other zone player(s), speaker(s), receiver(s), component(s) associated with the data network 128, and so on) in accordance with a communication protocol (e.g., any of the wireless standards IEEE 802.11a, 802.11b, 802.11g, 802.11n, or 802.15). To receive wireless signals and to provide the wireless signals to the wireless interface 404 and to transmit wireless signals, the zone player 400 of FIG. 4 includes one or more antennas 420. The wired interface 406 provides network interface functions for the zone player 400 to communicate over a wire with other devices in accordance with a communication protocol (e.g., IEEE 802.3). In some embodiments, a zone player includes both of the

8

interfaces 404 and 406. In some embodiments, a zone player 400 includes only the wireless interface 404 or the wired interface 406.

In some embodiments, the processor 408 is a clock-driven electronic device that is configured to process input data according to instructions stored in memory 410. The memory 410 is data storage that can be loaded with one or more software modules 414, which can be executed by the processor 408 to achieve certain tasks. In the illustrated embodiment, the memory 410 is a tangible machine readable medium storing instructions that can be executed by the processor 408. In some embodiments, a task might be for the zone player 400 to retrieve audio data from another zone player or a device on a network. In some embodiments, a task might be for the zone player 400 to send audio data to another zone player or device on a network. In some embodiments, a task might be for the zone player 400 to synchronize playback of audio with one or more additional zone players. In some embodiments, a task might be to pair the zone player 400 with one or more zone players to create a multi-channel audio environment. Additional or alternative tasks can be achieved via the one or more software modules 414 and the processor 408.

The audio processing component 412 can include one or more digital-to-analog converters (DAC), an audio preprocessing component, an audio enhancement component or a digital signal processor, and so on. In certain embodiments, the audio that is retrieved via the network interface 402 is processed and/or intentionally altered by the audio processing component 412. Further, the audio processing component 412 can produce analog audio signals. The processed analog audio signals are then provided to the audio amplifier 416 for play back through speakers 418. In addition, the audio processing component 412 can include necessary circuitry to process analog or digital signals as inputs to play from zone player 400, send to another zone player on a network, or both play and send to another zone player on the network. An example input includes a line-in connection (e.g., an auto-detecting 3.5 mm audio line-in connection). The audio amplifier 416 is a device that amplifies audio signals to a level for driving one or more speakers 418. The one or more speakers 418 can include an individual transducer (e.g., a “driver”) or a complete speaker system that includes an enclosure including one or more drivers. A particular driver can be a subwoofer (for low frequencies), a mid-range driver (middle frequencies), and a tweeter (high frequencies), for example. An enclosure can be sealed or ported, for example.

A zone player 400 can also be referred to herein as a playback device. An example playback device includes a Sonos® Play:5, which is manufactured by Sonos, Inc. of Santa Barbara, Calif. The Play:5 is an example zone player with a built-in amplifier and speakers. In particular, the Play:5 is a five-driver speaker system that includes two tweeters, two mid-range drivers, and one subwoofer. When playing audio content via the Play:5, the left audio data of a track is sent out of the left tweeter and left mid-range driver, the right audio data of a track is sent out of the right tweeter and the right mid-range driver, and mono bass is sent out of the subwoofer. Further, both mid-range drivers and both tweeters have the same equalization (or substantially the same equalization). That is, they are both sent the same frequencies, just from different channels of audio. Audio from Internet radio stations, online music and video services, downloaded music, analog audio inputs, television, DVD, and so on, can be played from a Sonos® Play:5. While the Play:5 is an example of a zone player with

speakers, it is understood that a zone player with speakers is not limited to one with a certain number of speakers (e.g., five speakers as in the Play:5), but rather can contain one or more speakers. Further, a zone player can be part of another device, which might even serve a purpose different than audio (e.g., a lamp).

IV. Example Controller

Referring now to FIG. 5, there is shown an example controller 500, which can correspond to the controlling device 130 in FIG. 1. The controller 500 can be used to facilitate the control of multi-media applications, automation and others in a system. In particular, the controller 500 is configured to facilitate a selection of a plurality of audio sources available on the network and enable control of one or more zone players (e.g., the zone players 102-124 in FIG. 1) through a wireless network interface 508. According to one embodiment, the wireless communications is based on an industry standard (e.g., infrared, radio, wireless standards IEEE 802.11a, 802.11b, 802.11g, 802.11n, or 802.15). Further, when a particular audio is being accessed via the controller 500 or being played via a zone player, a picture (e.g., album art) or any other data, associated with the audio source can be transmitted from a zone player or other electronic device to the controller 500 for display.

The controller 500 is provided with a screen 502 and an input interface 514 that allows a user to interact with the controller 500, for example, to navigate a playlist of many multimedia items and to control operations of one or more zone players. The screen 502 on the controller 500 can be an LCD screen, for example. The screen 500 communicates with and is commanded by a screen driver 504 that is controlled by a microcontroller (e.g., a processor) 506. The memory 510 can be loaded with one or more application modules 512 that can be executed by the microcontroller 506 with or without a user input via the user interface 514 to achieve certain tasks. In some embodiments, an application module 512 is configured to facilitate grouping a number of selected zone players into a zone group and synchronizing the zone players for audio play back. In some embodiments, an application module 512 is configured to control the audio sounds (e.g., volume) of the zone players in a zone group. In operation, when the microcontroller 506 executes one or more of the application modules 512, the screen driver 504 generates control signals to drive the screen 502 to display an application specific user interface accordingly.

The controller 500 includes a network interface 508 that facilitates wireless communication with a zone player. In some embodiments, the commands such as volume control and audio playback synchronization are sent via the network interface 508. In some embodiments, a saved zone group configuration is transmitted between a zone player and a controller via the network interface 508. The controller 500 can control one or more zone players, such as 102-124 of FIG. 1. There can be more than one controller for a particular system. Further, a controller can be integrated into a zone player.

It should be noted that other network-enabled devices such as an iPhone®, iPad® or any other smart phone or network-enabled device (e.g., a networked computer such as a PC or Mac®) can also be used as a controller to interact or control zone players in a particular environment. In some embodiments, a software application or upgrade can be downloaded onto a network enabled device to perform the functions described herein.

In certain embodiments, a user can create a zone group including at least two zone players from the controller 500. The zone players in the zone group can play audio in a synchronized fashion, such that all of the zone players in the zone group play back an identical audio source or a list of identical audio sources in a synchronized manner such that no (or substantially no) audible delays or hiccups could be heard. Similarly, in some embodiments, when a user increases the audio volume of the group from the controller 500, the signals or data of increasing the audio volume for the group are sent to one of the zone players and causes other zone players in the group to be increased together in volume.

A user via the controller 500 can group zone players into a zone group by activating a "Link Zones" or "Add Zone" soft button, or de-grouping a zone group by activating an "Unlink Zones" or "Drop Zone" button. For example, one mechanism for 'joining' zone players together for audio play back is to link a number of zone players together to form a group. To link a number of zone players together, a user can manually link each zone player or room one after the other. For example, assume that there is a multi-zone system that includes the following zones: Bathroom, Bedroom, Den, Dining Room, Family Room, and Foyer.

In certain embodiments, a user can link any number of the six zone players, for example, by starting with a single zone and then manually linking each zone to that zone.

In certain embodiments, a set of zones can be dynamically linked together using a command to create a zone scene or theme (subsequent to first creating the zone scene). For instance, a "Morning" zone scene command can link the Bedroom, Office, and Kitchen zones together in one action. Without this single command, the user would need to manually and individually link each zone. The single command might include a mouse click, a double mouse click, a button press, a gesture, or some other programmed action. Other kinds of zone scenes can be programmed.

In certain embodiments, a zone scene can be triggered based on time (e.g., an alarm clock function). For instance, a zone scene can be set to apply at 8:00 am. The system can link appropriate zones automatically, set specific music to play, and then stop the music after a defined duration. Although any particular zone can be triggered to an "On" or "Off" state based on time, for example, a zone scene enables any zone(s) linked to the scene to play a predefined audio (e.g., a favorable song, a predefined playlist) at a specific time and/or for a specific duration. If, for any reason, the scheduled music failed to be played (e.g., an empty playlist, no connection to a share, failed Universal Plug and Play (UPnP), no Internet connection for an Internet Radio station, and so on), a backup buzzer can be programmed to sound. The buzzer can include a sound file that is stored in a zone player, for example.

V. Example Ad-Hoc Network

Certain particular examples will now be provided in connection with FIGS. 6-8B to describe, for purposes of illustration only, certain base systems and methods to provide and facilitate connection to a playback network. FIG. 6 shows that there are three zone players 602, 604 and 606 and a controller 608 that form a network branch that is also referred to as an Ad-Hoc network 610. The network 610 may be wireless, wired, or a combination of wired and wireless. In general, an Ad-Hoc (or "spontaneous") network is a local area network or other small network in which there is no one access point for all traffic. With an established Ad-Hoc network 610, the devices 602, 604, 606 and 608 can all

communicate with each other in a “peer-to-peer” style of communication, for example. Furthermore, devices may come/and go from the network **610**, and the network **610** will automatically reconfigure itself without needing the user to reconfigure the network **610**.

Using the Ad-Hoc network **610**, the devices **602**, **604**, **606**, and **608** can share or exchange one or more audio sources and be grouped to play the same or different audio sources. For example, the devices **602** and **604** are grouped to playback one piece of music, and at the same time, the device **606** plays back another piece of music. In other words, the devices **602**, **604**, **606** and **608**, as shown in FIG. **6**, form a HOUSEHOLD that distributes audio and/or reproduces sound. As used herein, the term HOUSEHOLD (provided in uppercase letters to disambiguate from the user’s domicile) is used to represent a collection of networked devices that are cooperating to provide an application or service. An instance of a HOUSEHOLD is identified with a household **10** (or household identifier).

In certain embodiments, a household identifier (HHID) is a short string or an identifier that is computer-generated to help ensure that it is unique. Accordingly, the network **610** can be characterized by a unique HHID and a unique set of configuration variables or parameters, such as channels (e.g., respective frequency bands), SSID (a sequence of alphanumeric characters as a name of a wireless network), and WEP keys (wired equivalent privacy or other security keys). In certain embodiments, SSID is set to be the same as HHID.

In certain embodiments, each HOUSEHOLD includes two types of network nodes: a control point (CP) and a zone player (ZP). The control point controls an overall network setup process and sequencing, including an automatic generation of required network parameters (e.g., WEP keys). In an embodiment, the CP also provides the user with a HOUSEHOLD configuration user interface. The CP function can be provided by a computer running a CP application module, or by a handheld controller (e.g., the controller **308**) also running a CP application module, for example. The zone player is any other device on the network that is placed to participate in the automatic configuration process. The ZP, as a notation used herein, includes the controller **308** or a computing device, for example.

In certain embodiments, configuration of a HOUSEHOLD involves multiple CPs and ZPs that rendezvous and establish a known configuration such that they can use a standard networking protocol (e.g., IP over Wired or Wireless Ethernet) for communication. In an embodiment, two types of networks/protocols are employed: Ethernet 802.3 and Wireless 802.11g. Interconnections between a CP and a ZP can use either of the networks/protocols. A device in the system as a member of a HOUSEHOLD can connect to both networks simultaneously. In an environment that has both networks in use, it is assumed that at least one device in a system is connected to both as a bridging device, thus providing bridging services between wired/wireless networks for others. The zone player **606** in FIG. **6** is shown to be connected to both networks, for example. The connectivity to the network **612** is based on Ethernet while the connectivity to other devices **602**, **604** and **608** is based on Wireless. It is understood, however, that in some embodiments each zone player **606**, **604**, **602** may access the Internet when retrieving media from the cloud (e.g., Internet) via the bridging device. For example, zone player **602** may contain a uniform resource locator (URL) that specifies an address to a particular audio track in the cloud. Using the

URL, the zone player **602** may retrieve the audio track from the cloud, and ultimately play the audio out of one or more zone players.

VI. Example Music Sharing and Playback Configuration

Certain embodiments enable a user to stream music from a music-playing application (e.g., browser-based application, native music player, other multimedia application, and so on) to a local multimedia content playback (e.g., Sonos™) system. Certain embodiments provide secure systems and methods for multimedia content playback across a plurality of systems and locations. Certain embodiments facilitate integration between content partners and a playback system as well as supporting maintenance of such content and system.

FIG. **7** shows a system including a plurality of networks including a cloud-based network and at least one local playback network. The network includes a plurality of playback devices or players, though it is understood that the network may contain only one playback device. In certain embodiments, each player has an ability to retrieve its content for playback. Control and content retrieval can be distributed or centralized, for example. Input can include streaming content provider input, third party application input, mobile device input, user input, and/or other playback network input into the cloud for local distribution and playback.

As illustrated by the example system **700** of FIG. **7**, a plurality of content providers **720-750** can be connected to one or more local playback networks **760-770** via a cloud and/or other network **710**. Using the cloud **710**, a multimedia playback system **720** (e.g., Sonos™), a mobile device **730**, a third party application **740**, a retail location **750**, and so on can provide multimedia content (requested or otherwise) to local playback networks **760**, **770**. Within each local network **760**, **770**, a controller **762**, **772** and/or playback device **764**, **774** can provide a song identifier, song name, playlist identifier, playlist name, genre, preference, and so on, and/or simply receive content from a connected system via the cloud.

For example, a user listens to a third party music application (e.g., Pandora™ Rhapsody™, Spotify™, and so on) on her smart phone while commuting. She’s enjoying the current channel and, as she walks in the door to her home, selects an option to continue playing that channel on her household music playback system (e.g., Sonos™). The playback system picks up from the same spot on the selected channel that was on her phone and outputs that content (e.g., that song) on speakers and/or other playback devices connected to the household playback system. A uniform resource indicator (URI) (e.g., a uniform resource locator (URL)) can be passed to a playback device to fetch content from a cloud and/or other networked source, for example. A playback device, such as a zone player, can fetch content on its own without use of a controller, for example. Once the zone player has a URL (or some other identification or address) for a song and/or playlist, the zone player can run on its own to fetch the content. Songs and/or other multimedia content can be retrieved from the Internet rather than a local device (e.g., a compact disc (CD)), for example. A third party application can open or utilize an application programming interface (API) to pass music to the household playback system without tight coupling to that household playback system.

In another example of an application determining a playlist and/or other content for playback, a user enjoys listening to music on an online music service (e.g., turntable.fm or other virtual room that a user can enter to choose from a plurality of online disc jockeys (DJs) deciding what to play next) using his Mac Book Pro™ at home. He likes the unique user experience the service offers, and he frequently hops from room to room discovering new music. To maximize sound quality, he plays the music on his household playback system (e.g., Sonos™). A button or other indicator can be added to the turntable.fm Web application to switch the content being played to the playback system for output (e.g., to the Sonos™ system rather than or in addition to the Mac Book™). While Web-based applications typically do not have access to items on a local network, certain embodiments enable a third-party Web-based application (e.g., Turntable.fm) to talk to a playback system (e.g., Sonos™) in a certain way (e.g., may have to log in with a username and password), and the identified user has the website send audio or audio and video down to a playback device (e.g., a zone player) on the playback system local network to play music there (or some other media).

In another example, a first user creates a playlist (e.g., a Spotify™ playlist). The first user visits a second user's house, pulls out her smart phone and shares her playlist by playing it on the second user's household playback (e.g., Sonos™) system using her third party (e.g., Spotify™) application. The first user may also go to the third party content provider's (e.g., Spotify's™) website and share her playlist on the second user's playback system.

Thus, certain embodiments provide cross-service linking such that a song identifier can be passed from one user and/or service to another to be fetched and played. A user having a playlist on his or her phone can visit a friend and, using her account on her friend's system, play a song to which she has an access right. A retrieved song can be streamed locally to a user's phone, or an application can pass a song identifier to a local playback system which looks up the song identifier and finds an available audio stream to which the user has a right to play and then plays that song.

In another example, a user is staying in a hotel room or other facility including a local playback network. For example, a speaker and/or other playback device (e.g., a Sonos™ Play:3, Play: 5 and so on) in a hotel room can be utilized to play multimedia content to which the user has access from his or her playback network account, streaming audio source, third party application, and so on. Content can be output to one or more devices based on availability, access, configuration, priority, preference, and so on. In certain embodiments, a playback network includes a plurality of nodes, and each node has a capability to play sound in response to an input. Requested output is provided to a most logical connection, for example.

In certain embodiments, a phone device, a television device, and so on can be used to play music, audio, video and/or other multimedia content. In an example, a push button on a microphone or household intercom system to tell the kids dinner is ready is provided over the local playback network.

FIG. 8 shows a flow diagram for a method 800 to provide audio content to a local playback system. In the example method 800 of FIG. 8, a third party application acts as a "virtual line-in" to the local playback system. At block 810, streaming of music or other content from a third party application to a local content playback system is triggered. For example, a "Play to Sonos" button is pressed on a Rhapsody™ application. At block 820, content is streamed

to one or more components in a household playback network. The music may be streamed to predetermined zones or players in a household, for example. The music may be further directed to be played in different zones or players throughout the household. Playback on the local network can be facilitated to one or more zones/players based on a configuration (e.g., a zone scene, theme, and so on). Thus, certain embodiments allow a large degree of flexibility in where the music is actually played. For example, the music can be played in the kitchen, the family room, the patio, and so on. Further, the music may be redirected to different zones.

At block 830, the incoming content (e.g., audio) stream is provided directly from a third party application or other external source to the local playback network for playback. For example, rather than passing track identifiers, an audio stream is provided to a Sonos household system for playback to one or more configured zones. At block 840, the local playback system consumes the stream and plays it as it would other content on the local playback (e.g., Sonos™) network (e.g., via zones and so on). At block 850, a playback device (e.g., a zone player, Play:3™, Play:5™, and so on) adds timing information to the streaming content signal (e.g., the device takes the streaming audio signal and repackages it for local synchronized playback). In some embodiments, timing information is not added to the signal unless two or more playback devices are configured to play the audio in synchrony.

FIG. 9 shows a flow diagram for a method 900 to provide audio content to a local playback system. In the example method 900 of FIG. 9, a uniform resource indicator (URI) handler approach is provided for content output. At block 910, a link or other reference is embedded in a third party application (e.g., Facebook™ or Twitter). At block 920, when the link is selected (e.g., clicked), a local playback (e.g., Sonos™) controller, if available, is launched. At block 930, the application (e.g., accessed on a phone, tablet, computer, and so on) passes a URI for associated content (e.g., an audio track and so on) to a local playback system (e.g., Sonos™) controller. At block 940, the local controller outputs the associated content (e.g., plays the music) via the URI. For example, music is streamed from the cloud to one or more playback devices on the local playback network.

In certain embodiments, an application associated with the operating system can register to handle all URIs (URLs) that start with a certain prefix and can define how data is encoded into those URLs so a local playback system application can generate a link (e.g., "sonos:") and put that link into a message (e.g., email, text message, instant message (IM), etc.). The local playback application registered to handle such URLs can parse the URLs to determine what song, playlist, streaming radio station, etc., to play. This launches the controller application. For example, if a first listener likes a song and tweets that song, Twitter™ can include a clickable link which launches a playback application and starts the music playing on a local playback system if the local system can find the song (e.g., if have the application, if have rights/access to the song, etc.). In certain embodiments, the system knows to trigger the receiving user's system rather than the sending user's system to play associated content based on the transmitted link/identifier.

For example, an application can register with the system to handle all URLs that start with a custom prefix (e.g., an HTTP "scheme"). For instance, Sonos controller apps can register to handle any URL that begins with "sonos:" or "x-sonos:". In certain embodiments, a playback system provider can define and publish the format of its URLs so

that any third party application can create a link or reference to content. A large amount of data can be encoded into a URL using query parameters, for example.

In an example, when an application tries to “open” or “browse” to a URL, the system checks to see if the scheme of the URL matches the “sonos:” scheme that has been registered with the application. If a URL handler application is found, the system launches that application (e.g., the application can but does not need to be running in the background) and passes the URL to the application. The application then parses the URL and executes functionality based on the data in the URL. For example, the URL can contain the name of a music service and a playlist identifier from that service, plus the name of a Sonos™ Zone Player, causing the Sonos controller to start that playlist playing on that zone.

FIG. 10 shows a flow diagram for a method 1000 to provide audio content to a local playback system. In the example method 1000 of FIG. 10, at block 1010, a link or other reference is embedded in a third party application (e.g., Facebook™). At block 1020, when the link is selected, a playback system (e.g., Sonos™) server is contacted and provided with information regarding selected content for playback. For example, rather than launching a local controller application, a server is contacted regarding music for playback on a local network. At block 1030, using the provided information, the server identifies and provides the content locally on a user’s local playback system. For example, the server can then start playing the music directly on the user’s Sonos™ system (e.g., without going through a Sonos™ controller application).

In certain embodiments, a “single sign-on” technology is provided so that the user does not need to re-enter a username and password in order to authenticate to the playback server. Example single sign-on technologies include Facebook Connect™, Windows Live ID™, etc.

In certain embodiments, instead of using a specialized link, such as a “sonos:” link, a normal URL can be used to point to a playback system (e.g., Sonos™) webserver, which generates links with special data embedded in the link. A playback system is identified, and content identified by the URL can be playing at via the local playback network (e.g., mesh network configured for home, hotel room, etc.). Parameters such as authentication, security, location, and so on can be configured for local playback of remote content.

FIG. 11 shows a flow diagram for a method 1100 to provide audio content to a local playback system. The example method 1100 of FIG. 11 provides a “throw it over the wall” approach to content delivery to a local playback system. At block 1110, a third party application provides a multimedia playback device (e.g., a Sonos™ zone player (ZP)) with enough information about content (e.g., an audio track) so that, at block 1120, the local playback system (e.g., SonosNet™) can directly access a source of the content and, at block 1130, play the content directly off the network (e.g., the Internet) or cloud.

In certain embodiments, a local playback controller application is not involved. Information passed over to the local playback device may include an identifier for a single track, a playlist, a streaming radio station, a programmed radio station, and so on. This information can also include a current play position within a list to enable near-seamless “handoff” of music from a portable device to a local playback system. Once the music information is handed from the third-party application to the local playback system, there is no further synchronization between the two systems.

A connection between the third-party application and the local playback device (e.g., Sonos ZonePlayer™) can be direct over a local area network (LAN), remote through a proxy server in the cloud, and so on. A LAN delivery approach may be easier to integrate into “native” applications (e.g., applications written for iOS or Android), and a proxy server approach may be easier for third party applications that are browser-based, for example.

In certain embodiments, information is provided from a third party application to a local playback system without being routed through or by a controller application. Here, the third party application is communicating with the multimedia playback device (e.g., a Sonos ZonePlayer™). Information can be passed locally, rather than through the Internet, for example. The local playback device accesses the Internet to find content to stream, and the third party application takes the place of the controller application (e.g., throw it over the wall—the application passes information and the local playback system runs it).

Certain embodiments provide an approach similar to the “throw it over the wall” or one way communication approach of FIG. 11 except that the third party application not only tells the local playback system what to play, but also maintains two-way communication with the local playback (e.g., Sonos™) system. Two-way communication helps enable features such as keeping a local playback queue synchronized with a queue that the user is editing/managing in the third party application; allow the third party application to know what is currently playing on the local playback system; allow integrated transport control between the third party application and the local playback system; and so on.

In certain embodiments, a local playback system can pass information back to a third party application to indicate a current point of playback (e.g., now playing a third song in a playlist, fourth song in the playlist, and so on). The local playback system can pass parameter information, such as a change in volume, from a local multimedia playback device to the third party application so the application can reflect the change in volume to the user via its graphical user interface. The third party application can instruct the local playback system to skip a song, go to a certain location, and so on.

Certain embodiments provide a third party mode that allows users to select from any local playback network (e.g., Sonos™) controller to listen to audio from one or more third party applications on their smartphones or tablets (e.g., Android™ devices). For example, a user may be using a local playback network controller application and now wants a third party application to appear as an audio source within the controller application. The user can then select the controller application that he or she wishes to play audio from the third party application, for example.

Certain embodiments provide queue management to allow a third party application to control a local playback queue. That is, the local playback system has a queue, but the third party application allows users to add, delete and so on from the queue, for example. Rather than switch from content that the user is currently playing, the local playback system allows a user to create a playlist on the fly. For example, if last.fm users vote that they do not like a song and it should be skipped, then the local playback system will skip it.

Certain embodiments allow a third party application to override a local playback queue with its own application-specific queue. The local playback system periodically fetches a short list of tracks to play next. The list of tracks to play is determined by the third-party application, for

US 9,967,615 B2

17

example. In certain embodiments, a shared queue is provided between the local playback system and the third party application to keep the local system and application synchronized.

Certain embodiments allow control of playback system functions and/or settings via an external (e.g., third party) application. For example, a local playback system can allow volume control, play/pause, and so on and can interact with an application running on a given platform/operating system (OS). Certain embodiments provide a Web API that can be used to access functionality.

Certain embodiments facilitate control of a local playback system from outside a household or other location at which the local playback network is configured. For example, a user can queue up music while away from his or her house. The application can facilitate setup and/or configuration. For example, a third party application may ask the user to enter a Sonos customer email address and password. The application can then make a request to a Sonos server in the cloud to determine the zone groups on which music can be played.

Various inventions have been described in sufficient detail with a certain degree of particularity. It is understood to those skilled in the art that the present disclosure of embodiments has been made by way of examples only and that numerous changes in the arrangement and combination of parts can be resorted without departing from the spirit and scope of the present disclosure as claimed. While the embodiments discussed herein can appear to include some limitations as to the presentation of the information units, in terms of the format and arrangement, the embodiments have applicability well beyond such embodiment, which can be appreciated by those skilled in the art. Accordingly, the scope of the present disclosure is defined by the appended claims rather than the foregoing description of embodiments.

The invention claimed is:

1. A method comprising:

causing, via a control device, a graphical interface to display a control interface including one or more transport controls to control playback by the control device; after connecting to a local area network via a network interface, identifying, via the control device, playback devices connected to the local area network;

causing, via the control device, the graphical interface to display a selectable option for transferring playback from the control device;

detecting, via the control device, a set of inputs to transfer playback from the control device to a particular playback device, wherein the set of inputs comprises: (i) a selection of the selectable option for transferring playback from the control device and (ii) a selection of the particular playback device from the identified playback devices connected to the local area network;

after detecting the set of inputs to transfer playback from the control device to the particular playback device, causing playback to be transferred from the control device to the particular playback device, wherein transferring playback from the control device to the particular playback device comprises:

- (a) causing one or more first cloud servers to add multimedia content to a local playback queue on the particular playback device, wherein adding the multimedia content to the local playback queue comprises the one or more first cloud servers adding, to the local playback queue, one or more resource locators corresponding to respective locations of the multimedia content at one or more second cloud servers of a streaming content service;

18

(b) causing playback at the control device to be stopped; and

(c) modifying the one or more transport controls of the control interface to control playback by the playback device; and

causing the particular playback device to play back the multimedia content, wherein the particular playback device playing back the multimedia content comprises the particular playback device retrieving the multimedia content from one or more second cloud servers of a streaming content service and playing back the retrieved multimedia content.

2. The method of claim 1, wherein detecting the set of inputs to transfer playback from the control device to the particular playback device comprises detecting a set of inputs to transfer playback from the control device to a particular zone of a media playback system that includes the particular playback device as a first channel of a stereo pair and an additional playback device as a second channel of the stereo pair, wherein modifying the one or more transport controls of the control interface to control playback by the particular playback device comprises causing the one or more transport controls of the control interface to control playback by the particular playback device and the additional playback device, and wherein the particular playback device playing back the retrieved multimedia content comprises the particular playback device and the additional playback device playing back the multimedia content as the stereo pair.

3. The method of claim 1, wherein detecting the set of inputs to transfer playback from the control device to the particular playback device comprises detecting a set of inputs to transfer playback from the control device to a particular zone group of a media particular playback system that includes a first zone and a second zone, wherein the first zone includes the particular playback device and the second zone includes at least one additional playback device, wherein modifying the one or more transport controls of the control interface to control playback by the playback device comprises causing the one or more transport controls of the control interface to control playback by the particular playback device and the at least one additional playback device in synchrony, and wherein the particular playback device playing back the retrieved multimedia content comprises the particular playback device and the at least one additional playback device playing back the multimedia content in synchrony.

4. The method of claim 1, wherein the control interface is displayed by an application associated with the streaming content service, and wherein the set of inputs further comprises detecting an input to select a link in the application associated with the streaming content service and wherein selection of the link launches a second application to facilitate retrieving the multimedia content by the particular playback device from a particular source indicated by a resource locator.

5. The method of claim 1, wherein the control interface is displayed by an application associated with the streaming content service, and wherein the set of inputs further comprises detecting an input to select a link in the application associated with the streaming content service and wherein selection of the link causes the control device to transmit information to the one or more first cloud servers to add multimedia content to the local playback queue on the particular playback device.

6. The method of claim 1, further comprising detecting, via the control device, a set of inputs to transfer playback

US 9,967,615 B2

19

from the playback device back to the control device, wherein transferring playback from the playback device back to the control device comprises:

causing playback at the playback device to be stopped; and

modifying the one or more transport controls of the control interface to control playback by the control device.

7. The method of claim 1, wherein causing the graphical interface to display the control interface including one or more transport controls to control playback by the control device comprises causing the graphical interface to display a control interface that includes the one or more transport controls in a particular arrangement on the graphical interface, and wherein modifying the one or more transport controls of the control interface to control playback by the particular playback device comprises causing the graphical interface to display the one or more transport controls to control playback by the particular playback device in the particular arrangement.

8. The method of claim 1, wherein causing the one or more first cloud servers to add multimedia content to the local playback queue comprises causing an identifier of the multimedia content to be added to the local playback queue, wherein the identifier indicates a particular source of the multimedia content at the one or more second cloud servers of the streaming content service, wherein the particular playback device receives the multimedia content from the particular source at the one or more second cloud servers of the streaming content service.

9. The method of claim 1, wherein causing one or more first cloud servers to add the multimedia content to the local playback queue on the particular playback device comprises sending a message to the streaming content service that causes the one or more first cloud servers to add the multimedia content to the local playback queue on the particular playback device.

10. The method of claim 1, wherein detecting the set of inputs comprises detecting a selection of the multimedia content.

11. The method of claim 1, wherein detecting the set of inputs comprises detecting an input that causes playback at the control device to be stopped.

12. The method of claim 1, wherein detecting the set of inputs comprises detecting selection of a button on the control interface.

13. A tangible, non-transitory computer readable storage medium including instructions for execution by a processor, the instructions, when executed, cause a control device to implement a method comprising:

causing a graphical interface to display a control interface including one or more transport controls to control playback by the control device;

after connecting to a local area network via a network interface, identifying playback devices connected to the local area network;

causing the graphical interface to display a selectable option for transferring playback from the control device;

detecting a set of inputs to transfer playback from the control device to a particular playback device, wherein the set of inputs comprises: (i) a selection of the selectable option for transferring playback from the control device and (ii) a selection of the particular playback device from the identified playback devices connected to the local area network;

20

after detecting the set of inputs to transfer playback from the control device to the particular playback device, causing playback to be transferred from the control device to the particular playback device, wherein transferring playback from the control device to the particular playback device comprises:

(a) causing one or more first cloud servers to add multimedia content to a local playback queue on the particular playback device, wherein adding the multimedia content to the local playback queue comprises the one or more first cloud servers adding, to the local playback queue, one or more resource locators corresponding to respective locations of the multimedia content at one or more second cloud servers of a streaming content service;

(b) causing playback at the control device to be stopped; and

(c) modifying the one or more transport controls of the control interface to control playback by the playback device; and

causing the particular playback device to play back the multimedia content, wherein the particular playback device playing back the multimedia content comprises the particular playback device retrieving the multimedia content from one or more second cloud servers of a streaming content service and playing back the retrieved multimedia content.

14. The tangible, non-transitory computer readable medium of claim 13, wherein detecting the set of inputs to transfer playback from the control device to the particular playback device comprises detecting a set of inputs to transfer playback from the control device to a particular zone of a media playback system that includes the particular playback device as a first channel of a stereo pair and an additional playback device as a second channel of the stereo pair, wherein modifying the one or more transport controls of the control interface to control playback by the particular playback device comprises causing the one or more transport controls of the control interface to control playback by the particular playback device and the additional playback device, and wherein the particular playback device playing back the retrieved multimedia content comprises the particular playback device and the additional playback device playing back the multimedia content as the stereo pair.

15. The tangible, non-transitory computer readable medium of claim 13, wherein detecting the set of inputs to transfer playback from the control device to the particular playback device comprises detecting a set of inputs to transfer playback from the control device to a particular zone group of a media particular playback system that includes a first zone and a second zone, wherein the first zone includes the particular playback device and the second zone includes at least one additional playback device, wherein modifying the one or more transport controls of the control interface to control playback by the playback device comprises causing the one or more transport controls of the control interface to control playback by the particular playback device and the at least one additional playback device in synchrony, and wherein the particular playback device playing back the retrieved multimedia content comprises the particular playback device and the at least one additional playback device playing back the multimedia content in synchrony.

16. The tangible, non-transitory computer readable medium of claim 13, wherein the control interface is displayed by an application associated with the streaming content service, and wherein the set of inputs further com-

US 9,967,615 B2

21

prises detecting an input to select a link in the application associated with the streaming content service and wherein selection of the link launches a second application to facilitate retrieving the multimedia content by the particular playback device from a particular source indicated by a resource locator.

17. The tangible, non-transitory computer readable medium of claim 13, wherein the control interface is displayed by an application associated with the streaming content service, and wherein the set of inputs further comprises detecting an input to select a link in the application associated with the streaming content service and wherein selection of the link causes the control device to transmit information to the one or more first cloud servers to add multimedia content to the local playback queue on the particular playback device.

18. The tangible, non-transitory computer readable medium of claim 13, wherein the method further comprises detecting a set of inputs to transfer playback from the playback device back to the control device, wherein transferring playback from the playback device back to the control device comprises:

causing playback at the playback device to be stopped; and

modifying the one or more transport controls of the control interface to control playback by the control device.

19. The tangible, non-transitory computer readable medium of claim 13, wherein causing the graphical interface to display the control interface including one or more transport controls to control playback by the control device comprises causing the graphical interface to display a control interface that includes the one or more transport controls in a particular arrangement on the graphical interface, and wherein modifying the one or more transport controls of the control interface to control playback by the playback device comprises causing the graphical interface to display the one or more transport controls to control playback by the playback device in the particular arrangement.

20. The tangible, non-transitory computer readable medium of claim 13, wherein causing the one or more first cloud servers to add multimedia content to the local playback queue on the particular playback device comprises causing an identifier of the multimedia content to be added to the local playback queue, wherein the identifier indicates a particular source of the multimedia content at the one or more second cloud servers of the streaming content service, wherein the particular playback device receives the multimedia content from the particular source at the one or more second cloud servers of the streaming content service.

21. The tangible, non-transitory computer readable medium of claim 13, wherein causing one or more first cloud servers to add the multimedia content to the local playback queue on the particular playback device comprises sending a message to the streaming content service that causes the one or more first cloud servers to add the multimedia content to the local playback queue on the particular playback device.

22. The tangible, non-transitory computer readable medium of claim 13, wherein detecting the set of inputs comprises detecting a selection of the multimedia content.

23. The tangible, non-transitory computer readable medium of claim 13, wherein detecting the set of inputs comprises detecting an input that causes playback at the control device to be stopped.

22

24. The tangible, non-transitory computer readable medium of claim 13, wherein detecting the set of inputs comprises detecting selection of a button on the control interface.

25. A control device comprising:

a graphical interface;

a wireless communication interface to communicate with a playback device;

one or more processors;

tangible non-transitory computer-readable media having instructions encoded therein, wherein the instructions, when executed by the one or more processors, cause the control device to perform functions comprising:

causing the graphical interface to display a control interface including one or more transport controls to control playback by the control device;

after connecting to a local area network via the wireless communication interface, identifying playback devices connected to the local area network;

causing the graphical interface to display a selectable option for transferring playback from the control device;

detecting a set of inputs to transfer playback from the control device to a particular playback device, wherein the set of inputs comprises: (i) a selection of the selectable option for transferring playback from the control device and (ii) a selection of the particular playback device from the identified playback devices connected to the local area network;

after detecting the set of inputs to transfer playback from the control device to the particular playback device, causing playback to be transferred from the control device to the particular playback device, wherein transferring playback from the control device to the particular playback device comprises:

(a) causing one or more first cloud servers to add multimedia content to a local playback queue on the particular playback device, wherein adding the multimedia content to the local playback queue comprises the one or more first cloud servers adding, to the local playback queue, one or more resource locators corresponding to respective locations of the multimedia content at one or more second cloud servers of a streaming content service;

(b) causing playback at the control device to be stopped; and

(c) modifying the one or more transport controls of the control interface to control playback by the playback device; and

causing the particular playback device to play back the multimedia content, wherein the particular playback device playing back the multimedia content comprises the particular playback device retrieving the multimedia content from one or more second cloud servers of a streaming content service and playing back the retrieved multimedia content.

26. The control device of claim 25, wherein detecting the set of inputs to transfer playback from the control device to the particular playback device comprises detecting a set of inputs to transfer playback from the control device to a particular zone group of a media particular playback system that includes a first zone and a second zone, wherein the first zone includes the particular playback device and the second zone includes at least one additional playback device, wherein modifying the one or more transport controls of the

US 9,967,615 B2

23

24

control interface to control playback by the playback device comprises causing the one or more transport controls of the control interface to control playback by the particular playback device and the at least one additional playback device in synchrony, and wherein the particular playback device 5 playing back the retrieved multimedia content comprises the particular playback device and the at least one additional playback device playing back the multimedia content in synchrony.

27. The control device of claim 25, wherein detecting the 10 set of inputs comprises detecting a selection of the multimedia content.

28. The control device of claim 25, wherein detecting the set of inputs comprises detecting an input that causes 15 playback at the control device to be stopped.

29. The control device of claim 25, wherein detecting the set of inputs comprises detecting selection of a button on the control interface.

* * * * *